

The Milbank Memorial Fund

QUARTERLY

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IN THIS ISSUE

THE world-wide food shortage has highlighted the international picture in these postwar years and the importance to the world situation of national and international food policies which will contribute to the realization of freedom from want for all peoples is clearly evident. But this is not a new problem and in the depression years, before the recent World War, under the auspices of the League of Nations, the need to raise food standards throughout the world and to rehabilitate agriculture and world food markets had been discussed. Today these problems are more acute. At the Joint Conference of the Canadian Public Health Association and the State and Provincial Health Authorities of North America, held in Quebec May 21st, Dr. Frank G. Boudreau presented a paper on "Nutrition in War and Peace," which is published in the following pages. Pointing out that adequate nutrition is fundamental to good health, Dr. Boudreau urges professional public health workers to accept a responsibility in shaping nutrition policies which go to the heart of the problem, and in building a national and international nutrition program which will eliminate malnutrition. To accomplish such aims, Dr. Boudreau suggests that national food administrations should be continued and that national and state health administrations should have divisions of nutrition.

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Activities directed to improvement of the nutritional status of the public are in the process of developing to include many services in addition to the educational activities which have done so much to spread knowledge of nutritious diets to the public and to assist special groups with dietary and budgetary problems. The school lunch has become an accepted activity in

many communities. Fortification of flour to enhance its nutritive value was practiced on a national scale during the War and continuance of the program is now required by law in twenty-one states. Problems of distribution and storage of foods and methods of cooking in large quantities to preserve their nutritive values have received increasing attention together with programs for applying the information to improve food services in industrial cafeterias, in institutions, and the like. These are broad, general approaches affecting the general public or large groups on a mass basis. There is a growing recognition of the value and importance of nutrition services for special groups, such as pregnant women, persons exposed to toxic substances, and those with certain illnesses; and there is an increasing awareness of the need to study the prevalence of specific types of nutritional deficiencies and the factors associated with their occurrence, in order to give more direct and intensive service where it is most needed.

Health department activities related to the manifold aspects of a comprehensive nutrition program were discussed at the Round Table on "A New Approach to Nutrition Services in State Health Departments," at the Fund's 1946 Annual Conference. Three reports read at the Round Table are published in this issue of the *Quarterly*. "New Types of Activity for Nutrition Services in Public Health," by Dr. Walter Wilkins, is a general discussion of undeveloped activities in which he stressed the need for better epidemiological studies of nutrition. In "A Modern Nutrition Program in State Health Departments," Dr. Vlado A. Getting describes the services provided by the Massachusetts Department of Health, and the methods used to coordinate its work with that of other departments, and to assist and stimulate district and local activities. The subject of the third paper, by Dr. Robert S. Goodhart, is "Some Suggestions on the Organization and Functions of State Health Department Nutrition Programs for Workers."

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The two preceding issues of the *Quarterly* carried eight of the eleven papers presented at the Round Table on Postwar Problems of Migration, held in connection with the Fund's 1946

Annual Conference. The remaining three appear in this issue and the total series of papers will soon be available in bound form.

Each of the three papers in this issue is concerned with internal migration within this country. In "Wartime Shifts of Civilian Population," Dr. Henry S. Shryock, Jr. discusses the extent and character of nonmilitary migration since 1940, largely on the basis of sample surveys conducted by the Bureau of the Census during the postcensal years. He considers the origins and destinations of migrants, the pull of the congested production areas, the characteristics of the migrants, and the permanence of the wartime migrations.

Dr. Ira De. A. Reid presents the next paper, "Special Problems of Negro Migration During the War." He summarizes the existing data regarding volume and direction of the movement and discusses some of the implications. Whereas World War I helped to bring Negroes to the North, War II brought thousands to the West as well as to the North. "For the first time," according to Dr. Reid, "Negroes, Japanese-Americans, and Orientals are meeting at migration crossroads and becoming potential victims of further economic exploitation and maladjustment." Hence, "the development of social machinery wherewith to effect democratic adjustments in human relations has become a critical problem."

In the last paper, "Projection of Urban Growth and Migration to Cities in the United States," Drs. Philip M. Hauser and Hope T. Eldridge undertake "First, to project to the year 2000 the urban population of the Nation and the future population of places having 100,000 inhabitants or more; second, to project to the same period the volume of net migration to cities." They emphasize that the results are not predictions, but simply projections of what would happen under explicitly stated assumptions. Different assumptions are laid down for "low," "medium," and "high" estimates. The results at least delimit the ranges of possibilities under widely different assumptions.

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NUTRITION IN WAR AND PEACE¹

FRANK G. BOUDREAU, M.D.²

IT is a privilege to appear before the State and Provincial Health Authorities of North America in this historic city. It is also an unusual opportunity and a heavy responsibility—an opportunity to explore with you new vistas in the promotion of human health and welfare, and the responsibility of doing justice in a brief address to a most important and complex subject.

Let me begin by trying to recreate for you something of the atmosphere of the early 1930's when the world witnessed the spectacle of hunger and malnutrition among vast numbers of unemployed workers and their families, while the world's granaries were bursting with food that could not be sold. Food surpluses haunted the minds of leaders in government while bread lines formed below their windows and the unemployed sank lower and lower into misery. Governments bought up these food surpluses, dumped them abroad, denatured them so that they would be unfit for human use or destroyed them. In these circumstances, the outbreak of a Second World War could not have come as a surprise to the most casual student of world affairs.

It was at this time that delegates to the League of Nations, together with League officials, launched what came to be known as the world food movement, designed to release the economic jam by emphasizing that adequate diets were essential to human health, and that in supplying the raw materials for such diets, agriculture throughout the world would rise from its depression and in rising carry with it the industries needed to supply farm machinery, fertilizers, housing, roads, marketing equipment, and other essentials for agricultural rehabilitation. This movement, led by such men as Sir John Orr, F. L. Mc-

¹ Read before the Conference of State and Provincial Health Authorities of North America in Quebec City on May 21, 1947.

² Executive Director of the Milbank Memorial Fund; and Chairman of the Food and Nutrition Board, National Research Council.

Dougall, and Lord Bruce,³ rapidly gained momentum. Studies were made, under League auspices, of the health and nutrition of the unemployed and their families in the depressed areas of a number of countries. At the Assembly of the League, as well as at the International Labor Conference, the need for new food and nutrition policies for each country and for the world as a whole was the chief topic of debate. A committee of physiologists convened by the League set out for the first time in history a table of optimum dietary standards,⁴ and national nutrition committees or councils were set up in more than a score of countries. It was the belief of many that had this movement been started early enough the train of events leading to the Second World War might have been halted. But the current was moving too swiftly, the world was on the brink of catastrophe, and soon plunged into the Second World War. Eight years have been lost in the movement to promote better health and improve social conditions by raising the diets of the peoples of the world to more adequate levels, but in spite of the war, or perhaps because of it, important lessons have been learned which may in the long run accelerate the world's progress on the road to peace and prosperity.

Today for the second time within a generation we stand at the crossroads, one road leading to freedom from want and freedom from fear while the other, leads through nationalism and isolation to a third and perhaps final world war. The world situation today resembles so closely that which confronted us after the First World War that it would appear as if some higher power were saying to us: "I hope you have not forgotten your lesson for I am giving you another chance, and on your present choice will depend the fate of your civilization." The

³ Sir John Boyd Orr, then Director of the Rowett Research Institute at Aberdeen; F. L. McDougall, then Economic Adviser to the Australian Government; and Stanley M. Bruce, then Australian High Commissioner in London, and representative of Australia on the Council of the League of Nations.

⁴ Interim Report of the Mixed Committee of the League of Nations: Volume II. REPORT ON THE PHYSIOLOGICAL BASES OF NUTRITION. Series of League of Nations Publications, Geneva (1936, II.B.4).

choice we have to make today relates to the use to which we put the rapid increases in our knowledge made possible by the advance of science on a wide front.

Sir John Orr⁵ has said that every advance in knowledge which gives man new powers over nature inevitably brings about changes in the structure of our society. A good example is the invention of the printing press, which was followed by the spread of new ideas about the dignity and the rights of man. When the society of that day refused to accept the new ideas, there followed the American and French Revolutions. History teaches that those who resist these changes always lose in the long run, and because of the resistance changes come violently rather than peacefully, through revolution rather than evolution. Nowadays knowledge is increasing so rapidly that we are hard put to it to keep track of the advances even in a single field of science. Moreover, the changes brought about by this new knowledge which once were local or national in scope, now are felt throughout the world because of the great advances in transport and communication. Now that man has mastered some aspects of the release of nuclear energy, the question in everyone's mind and the unseen influence behind the foreign policy of governments, is whether the new force is to be used for atomic bombs or socially useful purposes; the way mankind answers this question will in the long run determine its fate.

In the drama of solving problems in the field of physical science, we tend to forget that during the last thirty years advances in our knowledge of biology have been even more rapid. This new knowledge is potentially just as dangerous to our society as our ability to manufacture rocket or atom bombs. Biology has taught us how to multiply the production of food from a given acreage; by using this new knowledge a few men on a few farms in a few countries,⁶ have increased the world's

⁵ Orr, Sir John Boyd: *Better Neighbors in a Changing World*. Proceedings of the Eighth Annual National Farm Institute, February 15-16, 1946, Des Moines, Iowa.

⁶ United Nations Interim Commission on Food and Agriculture: *Five Technical Reports on Food and Agriculture*, Washington, August 20, 1945. Also published separately as *Agricultural Production*. p. 112.

food production during every decade in the last two hundred years.⁷ By using the new methods on a wider scale, enough of the right kinds of food can be produced to nourish every inhabitant of the earth. And while we have learned to produce an abundance of food, our knowledge of human nutrition has increased so that we understand something of the important relation of food to health. The best fed peoples of the earth live longest, have the greatest physical and mental energy, possess the most abundant health and the greatest enjoyment in life.⁸ In view of our ability to produce enough of the right kinds of food to feed the entire population of the world, and in the face of our knowledge that the best fed peoples are the most healthy and prosperous, can our society endure once again the spectacle of two-thirds of the world's people malnourished or starving while food surpluses pile up or are destroyed? To ask the question is to answer it; the new powers over nature given us by scientific advance must be used for the benefit of world society or they will bring our civilization down to destruction in revolution and war.

These considerations bring up political, social, and economic questions of the most complicated character, and you may well ask, what have health workers to do with these ideas? The answer is simple; we as physicians and health officers have undertaken the responsibility for maintaining health and preventing disease among the populations under our care. It is our business to keep abreast of the stream of new knowledge, and to weave into the pattern of our work, the new methods and technics placed in our hands by advances in the natural and social sciences. In no other field of science has our knowledge advanced more rapidly than in nutrition. The earlier and much of the recent work has been done with animals, whose environment can be readily controlled and whose life span is short enough so that the effects of the different nutrients can be ob-

⁷ *Op. cit.*

⁸ McDougall, F. L.: *The Quantity and Physical Quality of Life in Relation to Poverty and Malnutrition*. United Nations Interim Commission on Food and Agriculture. Reviewing Panel Document 2, July 1, 1944.

served in a few years over several generations. For these reasons we know far more about the influence of nutrition on laboratory and farm animals than we do about its effects on human beings. But man too is an animal, and by analogy we can transfer to man the results of carefully controlled animal experiments. Moreover, in recent years an increasing number of human studies has been undertaken, and these have served to confirm the results of animal studies and to emphasize that the beneficial effects in animals of more adequate diets may be equalled or surpassed by the results in man. We know from animal experiments that adequate nutrition insures good litters, and that certain deficiencies in the diets of pregnant females will bring a large and fairly constant proportion of congenital anomalies.⁹ We know that a diet which will keep rats in good health for generation after generation, reproducing normally, and living out the normal life span, may give even better results if extra amounts of certain nutrients, such as vitamin A are added.¹⁰ On the improved diet the rats will mature more quickly, attain greater stature, remain longer in the prime of life, and live a longer life by about 10 per cent, equivalent to seven years in the human life span.

H. C. Sherman, who conducted many of these experiments, has this to say of the potentialities of better nutrition in human beings:

To a much more important extent than had been supposed, we build our own life histories by our daily use of food.

Through wiser choice and use of food we can build our own and our children's health to higher levels.

It is no exaggeration, it is a simple summary of scientific fact, to say that our new knowledge of food and nutrition brings us a new order of mastery of our life processes, and thus of our life histories.

In fact, what has recently been learned of the relations of food

⁹ Warkany, Josef: The Importance of Prenatal Diet. *The Milbank Memorial Fund Quarterly*, January, 1945, xxiii, No. 1, pp. 66-77.

¹⁰ Sherman, H. C.: *CHEMISTRY OF FOOD AND NUTRITION*. Seventh Edition, New York, The Macmillan Company, 1946.

to health constitutes one of the major scientific advances of our times.¹¹

These statements received dramatic illustration in the United Kingdom during the war just ended; every health officer should be familiar with the story.

In 1937 there appeared in Great Britain under the title *Food, HEALTH AND INCOME*, a report on adequacy of diet in relation to income. The report was based upon a survey of 1,152 family budgets, selected so as to constitute as representative a sample as possible. The conclusions of the report caused shocked surprise and aroused antagonism. Fortunately, when criticism and questioning had ended, action followed, and a far-reaching program for better nutrition, particularly of low-income families with children was adopted and carried out. The result was that when war came the people of the United Kingdom were better fed than they had ever been before.¹² The conclusions of the report, in brief, were as follows:

The average diet of the poorest group (up to 10s. per head per week), comprising four and one-half million people, is by the standard adopted, deficient in every constituent examined.

The diet of the second group (10s. to 15s.), comprising nine million people, is adequate in protein but deficient in all the vitamins and minerals considered.

The diet of the third group (15s. to 20s.), comprising another nine million, is deficient in vitamins and minerals. Complete dietary adequacy is almost reached in the fourth group (20s. to 30s.), and in the still wealthier groups (30s. to 45s.+), the diet has a surplus of all constituents considered.

A review of the state of health of the people of the different groups suggests that as income increases disease and death rates decrease, children grow more quickly, adult stature is greater and general health and physique improve.

The results of tests on children show that improvement of

¹¹ Sherman, H. C.: *FOOD AND HEALTH*. New York, The Macmillan Company, 1947.

¹² Orr, Sir John Boyd and Lubbock, David: *FEEDING THE PEOPLE IN WAR-TIME*. London, Macmillan and Co., Limited, 1940.

the diet in the lower groups is accompanied by improvement in health and increased rate of growth, which approximates to that of children in the higher income groups.

The lessons of this survey were so impressive, and the memory of the First World War when the British people were threatened with starvation so vivid, that when war broke out in 1939, the Government took steps to carry out a food and nutrition program which would provide for all the people the food needed for their health and working capacity. A scientific advisory committee on food and nutrition policy was set up by the Cabinet to which it reported directly. Its recommendations may be summed up in a sentence: everyone, without regard to income, should be supplied with food according to his or her physiological needs. This policy was put into effect and carried out along the following lines:¹³

A system of rationing was enforced, based on the principle that all the essential nutrients, even if in short supply, should be equally available to everyone to the extent necessary to maintain health, and at controlled prices.

Some common foods such as bread and potatoes were left unrationed, so that the differing requirements of human beings could be met by the individual.

For nutritional and transport reasons, bread was made from 85 per cent extraction flour instead of the usual 70-72 per cent extraction.

Expectant and nursing mothers, infants and school children were assured of an optimum diet regardless of their purchasing power. This meant that these groups had priority in the supply of such essential foods as milk, eggs and fruit. Cod liver oil and foods rich in ascorbic acid were also provided for these groups. School meals were made available in all the schools. Over a million and three-quarters of these were served in 1945, this amounting to 36.3 of the total school attendance.

By the end of the war three-quarters of all school children

¹³ On the State of the Public Health During Six Years of War. Report of the Chief Medical Officer of the Ministry of Health 1939-45. London, His Majesty's Stationery Office, 1946.

were receiving milk at school either at one-third of the market price or free. For adolescents working in factories so-called National Milk Cocoa was made available at a nominal price.

Margarine was fortified with vitamins A and D, calcium was added to flour and vitamin D to dried milk.

The well-to-do could buy extra meals in the regular restaurants, and to equalize the position and provide for the greater needs of working people British restaurants were set up where substantial meals of nourishing food could be obtained at cost. Similar provision was made for factories, and those which employed 200 or more workers were required to provide canteens or cafeterias. Special arrangements were made for the inmates of institutions and for invalids. The essential feature of the whole scheme was that each individual, regardless of income, had a right to the food necessary to maintain his health.

Having made the best possible plans to feed the people adequately the next step was to see that they were working out properly. For this purpose a complete system of dietary, weight, and clinical surveys was inaugurated. Dietary surveys revealed whether representative samples of the population were receiving adequate diets, weight surveys showed whether the calorie content of the diet was satisfactory, and clinical surveys the presence or absence of nutritional deficiencies. The clinical surveys were of two types: the rapid examination by medical officers of hundreds of persons weekly to detect clinical signs indicative of a deficiency, and the more thorough survey including biochemical examinations of the blood and urine of several hundred people in a town by a mobile team from the Oxford Nutrition Survey. A few words about the results of these assessments are pertinent here. These "suggest that the nutritional state of the nation was not worse at the end than at the beginning of the war, and as regards children was somewhat better." Again, "Although the child at the end of the war was bigger, more resistant to disease, better nourished and in every way had borne the strain of war better than his predecessor of the last war, much remains to be done before the average ele-

mentary school child can be assured of that physical development which he is inherently capable of attaining."

As regards anemia in women and children "it seemed fairly certain that no greater degree (was found) than in the limited number examined before the war, and that in certain groups there was probably less."¹⁴

In the program to maintain the health of the entire population by means of adequate diets, two other factors deserve mention. One was the setting up of a Ministry of Food which had control of the production, import, pricing, and distribution of food, and the other a systematic campaign of education in nutrition. Time does not permit me to more than mention these factors. Many detailed reports are available to the interested reader, and a short account of the work of food management in the United Kingdom during the war is to be found in the first of five technical reports prepared by the Interim Commission for the Quebec Conference of the United Nations on Food and Agriculture.

What have been the results of the wartime policy respecting food and nutrition in the United Kingdom? I give them to you in the words of Sir Wilson Jameson, Chief Medical Officer of the Ministry of Health and of Dr. H. E. Magee, Deputy Senior Medical Officer of Food, Dietetics, and Nutrition. Here is the story as told to the British people over the radio by Sir Wilson Jameson in December, 1944:

After five years of war we still have a good story to tell. The most sensitive index of a nation's general health is probably the proportion of infants dying in the first year of life. In the last war it rose steadily. During the last three years it has declined steadily and last year, was the lowest ever recorded. The most risky time for a baby is its first month of life. Well, we've got a new low record there; and as for the tragedy of babies born dead (stillborn as we say) I can tell you that the chance of this happening is only three-fourths of what it was five years ago. The death rates for children up to ten years of age were last year

¹⁴ *Op. cit.*

the lowest on record, as was also the proportion of mothers dying as a result of their confinements. As the war has gone on, the vital statistics for mothers and children have continued to improve and in the fifth year they're the best we ever had. This can't be just an accident. All that's been done to safeguard mothers and children must have had some effect—such things as the national milk scheme, vitamin supplements for mothers and children, the great extension of schemes for school meals and milk in schools. There are doubtless other factors—full employment and higher purchasing power in many families, especially in the old depressed areas; as well as the careful planning from a nutritional point of view of the restricted amount of food available for the nation.

The following is taken from a lecture by Dr. Magee:¹⁵

The war-time food policy was the first large-scale application of the science of nutrition to the population of the United Kingdom. . . . A diet more than ever before in conformity with physiological requirements became available to everyone, irrespective of income.

The other environmental factors which might influence the public health had, on the whole, deteriorated under the stress of war. The public health, so far from deteriorating, was maintained and even in many respects improved. The rates of infantile, neonatal, and maternal mortality, and the stillbirth rate reached the lowest levels ever. The incidence of anaemia declined, the growth-rate and the condition of the teeth of school children were improved, and the general state of nutrition of the population as a whole was up to or above prewar standards. We are therefore entitled to conclude that the new knowledge of nutrition can be applied to communities with the expectation that concrete benefit to their state of well-being will result.

In view of these results it is no wonder that Sir Wilson Jameison has come to the conclusion that "Nutrition is the very essence and basis of national health."¹⁶

The great progress which has been made in public health

¹⁵ Magee, H. E.: Application of Nutrition to Public Health, Some Lessons of the War. *British Medical Journal*, March, 1946, p. 475.

¹⁶ Cf. Footnote 13.

work during the last forty years has been based largely on the work of Pasteur and his disciples, who taught us the specific causes of many of the diseases which constituted the chief health problems in the twentieth century. If public health work is to win new triumphs, its achievements must be based in future on advances in our knowledge of biology, particularly as these relate to man's dietary requirements, and the influence of good nutrition on health. Here is a sure foundation upon which to build, for the new knowledge comes from carefully controlled experiments in animals and human beings and it has been put to the most rigorous test among large populations in wartime. The influence of this great store of new knowledge is being felt throughout the world. It was responsible for the insertion in the Atlantic Charter of one of the four freedoms: freedom from want. It led to the establishment of United Nations Relief and Rehabilitation Administration, Food and Agriculture Organization of the United Nations, the International Emergency Food Council, and the International Children's Emergency Fund. One of the most important problems facing the United Nations today is that of adapting agricultural production, economic and fiscal policy to a world in which the fear of unsaleable surpluses of food exists side by side with hunger and malnutrition among something like two thirds of the world's population. There can be no political security, no peace in the world until this problem is at least on the way to a reasonable solution. We, who are devoting our lives to a public health career, may shrink from stepping outside of our accustomed role. But in the world as it exists today, every profession which has something to contribute to the stability of society, has responsibilities which cannot be evaded. It is the task of professional health workers to keep abreast of the advances in biology, and to devise the mechanisms—the ways and means of utilizing these advances for the promotion and maintenance of the public health. In the face of the experience I have cited, health workers can no longer be content with desultory programs of education in nutrition and super-

ficial systems of medical inspection of school children. The maintenance of a good state of health which is one of the results of an adequate diet, is surely no less important than the prevention of specific diseases. Yet in the modern state lack of income is no bar to immunization against smallpox and diphtheria; while there is no similar general provision for giving pregnant women whose diet is inadequate the nutrients necessary to maintain the health of mother and offspring.

I cannot in the limits of this paper describe a complete public health program in nutrition even if I were qualified to do so. Such programs must be evolved by experience and adapted to the conditions and needs of particular regions. But I can point to successful war experience in the field of nutrition and suggest that the most useful items in that program should be maintained in peacetime. We need to compensate for the social and economic losses suffered in the war by preserving and maintaining any benefits which may have come from that terrible experience. Some of the agencies in the wartime program of food and nutrition which deserve to be retained are the following:

1. *National Food Administrations.* The Ministry of Food in the United Kingdom has done notable work in the field of what has come to be known as food management.¹⁷ In the United States of America experience during the war revealed the need for a War Food Administration and one was finally set up, but it has been discontinued. In many countries much of the work of a food administration is carried on by the Ministry or Department of Agriculture. But in the Department of Agriculture the emphasis is quite properly on the needs of agriculture whereas the food administration should be concerned with all consumers of whom farmers constitute a larger or smaller percentage according to the development of agriculture in a particular country. Briefly, it is the task of a national food administration to see that the food needed for the health of the

¹⁷ United Nations Interim Commission on Food and Agriculture: *Five Technical Reports on Food and Agriculture*, Washington, August 20, 1945. Also published separately as *Nutrition and Food Management*.

people is provided, either by indigenous production or import, at prices the different income classes can afford to pay. The food administration should be guided by the national department of health, which will determine dietary standards and by appropriate dietary and clinical surveys, keep its finger on the pulse of the people insofar as nutrition is concerned.¹⁸

2. *National Nutrition Committees or Councils.* On the proposal of an advisory committee set up by the League of Nations before the war, many governments set up national nutrition councils or committees. These consisted of high representatives of the different government agencies concerned together with university scientists and consumer representatives. It was the business of these councils to advise the governments on nutrition policy. The final responsibility for such policy rests upon the government of the day, but it is of great advantage to the government to have the views of independent persons who are not subject to the pressures which every government agency must bear. The secretary for health, chief medical officer, or national health commissioner is usually the chairman of such a council. A National Nutrition Council did useful work in Canada during the war, and in the United States this function was performed in a limited way by the Food and Nutrition Board of the National Research Council. The United Nations Conference on Food and Agriculture held at Hot Springs in 1943 emphasized the need for such councils, and Lord Horder, chairman of FAO's Standing Advisory Commission on Nutrition is now urging governments to set them up. The National Nutrition Council of the Government of the Union of South Africa has furnished an excellent account of the organization and work of such councils.¹⁹

3. *Division or Bureau of Nutrition.* Every national health administration should have a division or bureau of nutrition,

¹⁸ In a confederation like the United States of America where much of public health work is reserved to the states, it is worth considering whether there should not be set up in each state, a state food administration.

¹⁹ Union of South Africa—First Report on the Activities of the National Nutrition Council. For the Period 27th June, 1940, to 31st December, 1943. Printed in the Union of South Africa by the Government Printers, Pretoria, 1944.

headed by a physician with special training and experience in biochemistry and clinical nutrition. Such a division or bureau should also be set up in large city health departments. For work in the field qualified physicians as well as nutritionists should be employed. But something more than qualified staff is needed; the health officer himself must know enough about nutrition to provide the proper kind of encouragement and support. Therefore, in addition to the training received by undergraduates in medicine, courses in nutrition should be required in all public health schools. It seems absurd that some such schools now give degrees in public health to students who have never received any advanced training in nutrition.

So much for some important elements of the organization required to carry out programs of nutrition. As for the programs themselves, the subject is so vast that I must confine myself to the merest outline, emphasizing a few essential activities:

A. Research and investigation are two of the most important items in such a program. Leaving out the kind of fundamental research which advances our knowledge of the science of nutrition, I emphasize the need for investigation of the problems which confront the health officer. What is the state of nutrition of his people? How adequate is their diet? Which classes in the community require special attention? These and similar questions can be answered by dietary, clinical and biochemical studies of representative samples of the population. Experience teaches that classes which are under pressure or stress from any cause are most apt to be malnourished. This at once draws our attention to pregnant women, infants, school children, adolescents, invalids, convalescents, and the aging, particularly as these are found among the lower-income groups.²⁰

B. In carrying out nutrition programs a good beginning can be made with pregnant women, who should receive an adequate diet from the beginning of pregnancy. Here it is not sufficient to attempt to educate the pregnant woman in good food habits; if necessary, she should be supplied at public expense with the

²⁰ United Nations Conference on Food and Agriculture. *Final Act and Section Reports*, Washington, 1943, pp. 47-48.

supplements which investigation shows are necessary to bring her diet up to adequate levels. Many animal and human studies have demonstrated that a good nutritional status during pregnancy will reduce the toxemias, cut down maternal mortality, lessen premature births and greatly reduce infant mortality from this cause.²¹ I can think of no better way for the health department of a large area to demonstrate the potentialities of a modern public health program than a campaign to raise the diets of all pregnant women to adequate levels. In Wales during the war the death rate from prematurity, which was at an unusually high level, was reduced to one of the lowest in the United Kingdom by this means.²²

C. Special attention to the diets of industrial workers is also worth emphasizing. The issue of the late war depended as much on the output of munitions as it did upon the result of military and naval engagements. When this came to be realized in the United Kingdom, in Canada, and in the United States, special machinery was set up to ensure that workers were well fed. In all countries the results were excellent. In the United States, as a result of the campaign, proper facilities were provided in large plants for feeding many millions more than before the war or in the first war years. Industrial feeding programs lend themselves readily to programs of education in nutrition; employers and management cooperate gladly because they have found that the provision of suitable facilities for feeding their workers is an important factor in improving labor relations. Special attention should be paid to workers in the heavy industries whose caloric expenditure is high.

D. A fourth most important item in the program is the school meal. Many children who are entitled to the free schooling provided by the modern state are unable to profit because of their poor state of health resulting from under or malnutrition. Numerous studies have shown that well-balanced school meals improve the health, growth, and learning power of the pupils. Students of population have suggested tentatively that school

²¹ Tompkins, Winslow T.: The Significance of Nutritional Deficiency in Pregnancy. *Journal of the International College of Surgeons*, 4: 147-154 (No. 2), April, 1941.
Ebbs, J. H.; Tisdall, F. F.; and Scott, W. A.: The Influence of Prenatal Diet on the Mother and Child. *The Milbank Memorial Fund Quarterly*, January, 1942, xx, No. 1, pp. 35-46.

²² Ryle, John A.: Personal communication.

meals provided at public expense to every pupil would be a proper first item in a population policy adapted to the declining fertility of Western civilization.²³ In combination with school gardens the school meal may be used in teaching biology as well as in inculcating good food habits. It is a powerful means of building health into the structure of our society.

I must bring this long address to a close before I try your patience too far. My purpose in accepting your invitation was to show you that great opportunities exist for the health officer who undertakes to apply in his district even a small part of the new knowledge of food and nutrition that is now available for his use. The formulation and carrying into effect of a sound nutrition program will bring new life to public health departments; it will widen their scope and increase their influence and prestige. The public health workers concerned will be refreshed by their closer association with the research workers who have made new knowledge available, and whose contribution was never so important to society as it is in this critical age; they will be joining in the attempt to give the public the benefit of advances in science which otherwise would bring critical pressures to bear on our society. Let me close with a quotation from my friend Dr. James S. McLester who has done so much to make physicians understand the importance of nutrition in medical practice:

In the past, science has conferred on those peoples who availed themselves of the newer knowledge of infectious diseases, better health and a greater average length of life. In the future, it promises to those races who will take advantage of the newer knowledge of nutrition, a larger stature, greater vigor, increased longevity, and a higher level of cultural attainment. To a measurable degree, man is now master of his own destiny, where once he was subject only to the grim hand of Fate.²⁴

²³ Lorimer, Frank: *Population as a Problem in Quality*. Chapter in *FOOD FOR THE WORLD*. Chicago, University of Chicago Press, 1945.

²⁴ United States Department of Agriculture: *FOOD AND LIFE. YEARBOOK OF AGRICULTURE*, 1939. Washington, Government Printing Office, p. 2.

NEW TYPES OF ACTIVITY FOR NUTRITION SERVICES IN PUBLIC HEALTH

WALTER WILKINS, M.D.

THE problem of the relationship of nutrition to health has been forced upon the attention of public health authorities by reports of far more wide-spread supposed malnutrition than we formerly suspected. At the same time, perhaps we are now less sure of some aspects of the problem than we were a few years ago. Public health has gradually been assuming more responsibility in this field. The purpose of the meeting today is to criticize ourselves for what we have not done, to consider new types of activity that have recently come into the picture, and to project philosophies and plans for the future.

Public health is dynamic rather than static. The relative urgency of different problems is constantly shifting. Among the factors which cause such changes are the following:

1. Some conditions are brought under control and require less concentrated effort.
2. Some problems are brought about by changes in our mode of living; for example, the urbanization of populations.
3. New discoveries make possible new approaches to old problems.
4. New discoveries uncover health hazards which formerly went unrecognized.
5. National emergencies, such as war, epidemics, depression, and inflation present additional problems and demand reevaluation of activities which have become routine during normal times.

For these and possibly other reasons some of our activities in the field of nutrition have been undergoing changes. I wish to point out some of the factors contributing to increased interest in nutrition by public health workers, some recent develop-

ments in health departments, and some urgent needs as I see them.

The Food and Nutrition Board of the National Research Council has done much to stabilize the whole field of human nutrition and at the same time to stress the importance of nutrition as a health problem. Bulletin 109, prepared by its Committee on Diagnosis and Pathology of Nutritional Deficiencies, was placed in every state and local health department of the entire country and was in great demand by public health workers. The food tables prepared by the Board for the Quartermaster General's office have been widely used by health departments and have also served to indicate the importance that the army places on good nutrition.

The establishment of the Nutrition Foundation has added greatly to our forces directed at getting at the bottom of various nutrition problems. Also, *Nutrition Reviews* is widely read by public health personnel since it puts highly specialized nutrition information into language that can be understood by the many public health workers not trained in this field. The recently established National Vitamin Foundation is another step forward.

The close cooperation of the national, state, and local health agencies with other groups during the war is among the important new developments in public health nutrition activities. This work with other agencies gave many public health workers a new broader concept of the nutrition problem, including the realization that it is too complex and far-reaching for any one group alone to solve. Let us hope that this cooperative relationship will become even closer.

The experiments on the effect of adding fluorine to drinking water on dental caries that are now being carried out by the United States Public Health Service in Grand Rapids, Michigan, and by the New York State Department of Health in Newburgh, New York, are I believe, among the most comprehensive and significant nutrition experiments ever conducted in this country and are good examples of what public health

might do in regard to other problems possibly related directly or indirectly to nutrition.

The participation of health departments in sponsoring and administering the food enrichment programs set up in various states is a new activity which was unheard of a few years ago, with the exception of interest in iodized salt in some areas.

The establishment of the Nutrition Section in the States Relations Division of the United States Public Health Service will, I hope, set the pace for what may be done in the various states on a local and smaller scale. It is hoped that the increased appropriations to the Children's Bureau for maternal and child health work will facilitate and hasten this trend.

The cooperative studies by health departments and medical schools have been carried out in several states; for example, those sponsored by Miss Moore and Dr. Goldsmith and representatives of the State University in Louisiana, Dr. Hutchinson in Tennessee, Dr. DeKleine in Michigan, and Dr. Pierce in Vermont. This plan has possibilities for future development. We feel a great need for this type of joint study in Florida, but we have no medical school in the State.

In 1945, a nutrition study on school children was carried out jointly by the State Health Department, the Agricultural Extension Service, and the State Education Department of West Virginia. This type of pattern is worth the consideration of such departments in other states.

The interstate or regional cooperative nutrition studies made by land-grant colleges; for example, in the Northwest, Middle-west, and South, serve to indicate a pattern that state health departments might consider in cooperative studies of regional nutrition problems of a public health nature.

Comprehensive nutrition services to state institutions are greatly needed. Two years ago while making some observations in a state institution on the site where one of Goldberger's most important demonstrations was carried out, I was shocked to note what a group of patients was eating for supper. The meal consisted of baked beans and soggy biscuits in large quantities.

In 1884, when little was known about nutrition as a science, Trudeau demonstrated the value of good food (among other things) in the treatment of tuberculosis. Today, 62 years later, how many authorities in state tuberculosis institutions are sufficiently convinced of this relationship to provide their patients with optimal diets? The type of nutrition consultation service to state institutions, developed in California several years ago, serves as an example of what state health departments can do in this field. However, I understand that in California this activity has been transferred to the State Department of Corrections.

The establishment by the New York City Health Department of the Nutrition Clinic will, we hope, encourage other health departments to give consideration to this type of service. The nutrition laboratory work being done at the Public Health Research Institute of the City of New York is another landmark in nutrition services of health departments.

Some city health departments have had nutritionists for years, and now there is a distinct tendency for county health officers to be interested in adding nutritionists to their staffs.

A number of state health officers have expressed great interest in setting up divisions of nutrition within the state structure. Just what the best administrative set-up is has not been shown. It is hoped that this will be tested and tried sufficiently to answer this question intelligently. We have not yet answered it in Florida. Certainly there is a wide range of choice in administrative set-up, but most authorities agree that it is highly desirable to have such programs headed up by individuals with medical as well as special nutrition training. Thus far Florida is the only state to have a public health nutrition unit headed by a full-time medical director. Public health nutritionists all over the country have long felt the need for this type of set-up. At present several states are considering similar units for making nutrition investigations and giving nutrition service.

The tendency toward more and better nutrition instruction

in schools of public health is encouraging. This will, no doubt, help to give incoming public health personnel a better insight into the science of nutrition. How much is being done in these courses to develop a point of view in regard to public health nutrition work, I do not know.

Studies on animal nutrition in relation to soil and water have, I believe, done much to stimulate a belated interest in human problems of the same character. It was Dr. Welch in the Agricultural Experiment Station in Montana who found that iodine deficiency was responsible for the large number of hairless pigs being born in some areas of that State. This antedated by a few years the classic studies of Marine on iodine-deficiency goiter. Margaret Smith of the Arizona Extension Service showed the relation between fluorine and mottled enamel of the teeth which is so prevalent in many sections of the Southwest. The public health application to dental caries was developed by Dr. Dean of the United States Public Health Service. The work of agricultural groups in Florida has set the pace for studies on relationships of cobalt, copper, and iron to salt-sickness or coastal disease among cattle in which severe anemia is prominent among the characteristic findings. Knowledge of this work rapidly spread to Australia and New Zealand where salt-sickness is also a problem.

The revolution that has occurred in plant and animal nutrition should stimulate biologically trained investigators to speculate as to further possibilities that might exist for humans. Can health departments take a cue from these and make similar progress in the nutrition of population groups?

Unfortunately little of the great mass of data resulting from nutrition studies on animals has been shown definitely to apply also to humans. If we assume that the goal of many such animal studies is their ultimate application to human physiology, we must admit that we have done too little to study out and confirm or disprove such relationships. Too often data obtained on animals have been assumed, without adequate evidence, to apply to humans.

Unfortunately a large part of nutrition research done on groups of individuals has been directed at supposed evaluation of nutritional status without any attempt to study or demonstrate the effect of making up the supposed deficiency by specific therapeutic testing or by other means. In the numerous studies presuming to appraise the nutritional status of certain groups of individuals little has been done to study or give adequate proof as to what signs and symptoms are due to specific deficiencies. For example, numbers of studies on hemoglobin levels of population groups have appeared, but few of these have even attempted to determine the etiology of low hemoglobin values when found. We know of the supposed widespread mild anemia in the South, but no one has yet made studies sufficiently comprehensive to show the relative importance of even the known anemia-producing factors in the different areas—not to speak of possible unknown factors. Thus, little is known concerning differential etiologic diagnosis of this so-called subclinical anemia in the South. If hookworm disease is one of the major factors, why do we consistently find lower hemoglobin values among Negro school children than among white children of the same community, while far less hookworm disease is found in the Negro children? Do not take this to imply that I feel that hookworm disease is not an important anemia-producing factor, but rather to suggest that this anemia may be of multiple and complex etiology which may vary in different areas. At present we are working on this problem in Florida.

Of course, it is important that fact-finding be followed by adequate educational effort by public health and other groups. Two years ago I visited a county in a far-western state which in 1924 had an incidence of 83 per cent iodine-deficiency goiter. On questioning high school girls I found that still only about half of their families were using iodized salt. On a rough check at the three grocery stores in the community I found that only about one-half of the salt sold in small quantities, presumably for human consumption, was iodized. I found an appreciable

number of high school students with enlarged thyroid glands. This is an example of inadequate educational follow-through. Also I believe that in our educational efforts we would do well to consider the demonstration method as opposed to the didactic. This has been amply shown to be worth while.

Suppose we were asked to prove, to demonstrate, to back up our loose statements, how often could we come through without embarrassment? How often can the health officer, the nutritionist, and the public health nurse speak with real authority on nutrition problems of the community? On causes and effects? When there is concentrated effort to study and define the major nutrition problems in a given community, educational efforts can then be directed toward these. In most communities the only information even resembling quantitative data is on predominating food patterns of the group. We must place far more emphasis on differential diagnosis and on the epidemiological aspects of the problem. In my last conversation with Dr. Milton Rosenau before his death, I was discussing with him the great need for more adequate fact-finding in the nutrition field by public health agencies, and told him of what we hoped to do in Florida. He summed up our conversation by saying, "In other words, we must use the epidemiological approach." I believe that we would do well to consider this type of approach in studying the relationship of nutrition to susceptibility to the common cold and various other communicable diseases, emotional instability, heart disease, learning ability, visual acuity, premature aging, endemic anemia, toxemias, and other complications of pregnancy.

The classic studies of Goldberger on pellagra, Marine and Means on iodine-deficiency goiter, and the later studies by Dean on fluorine in relation to dental caries should serve as examples of the types of fact-finding that could be done by state health departments either singly or in regional groups. These studies were directed at specific problems known to exist and not at multiple problems as has so often been done in so-called community nutrition surveys. The latter have too often

been superficial in character ending up with reams of data and practically nothing regarding etiology of conditions found. A crude analogy might be drawn to these two approaches as follows: Aiming a rifle at a specific target as compared with firing both barrels of a shotgun aimlessly, hoping that something will be hit. We would do well to consider the single-problem type of study of the etiological variety as providing the fundamental knowledge so greatly needed at the present. I do not believe that we are going to get very far by running around just to see what we can find. This point is the core of my remarks.

We must set up something comparable to Koch's postulates and proceed to apply these to our nutrition investigations on a comprehensive scale. With certain notable exceptions, the puny showing that public health has thus far made in this field is unfortunate. However, there are indications that new interest is developing and that possibly we are beginning to get on the right track. We need far more studies of the type carried out by Tisdall and associates in Toronto and Stuart and Burke and associates in Boston on nutrition in relation to pregnancy, and by Ruth Flynn Harrell in Virginia on the relationship of nutrition to learning ability.

I believe that the time has come when public health groups must make the choice between doing something basically constructive in this field or admitting that we have failed. As public health workers, are we going to echo the shouts of the radio announcer or are we going to put our nutrition on a sound public health basis? Do not take these remarks to imply that public health nutritionists are not doing a good job. Actually they have done a great deal with very little, but I believe that the public health nutritionists here today will support me in the statement that too often they have had to assume that certain problems existed because no investigative or diagnostic services were available. Suppose a person working in the field of communicable diseases were thus put on the spot?

We have tackled other problems of equal importance by getting the facts, analyzing the findings, appraising the data, and

drawing only sound conclusions. What other group has the entree, the prestige, and the medical and scientific background and experience to make wide-scale and comprehensive studies which are directed at specific questions on large segments of populations? Are we going to sit back and wait for some Aladdin to rub the lamp and furnish us with miraculous tools, or are we going to forge our own tools and apply these along with other groups toward building that superstructure of health that we often talk about so glibly?

If we believe, as we have said time and time again, that a greater knowledge of nutrition can make a contribution to health, longevity, and happiness, let us pool our resources, where possible, with other groups, and begin to study specific problems on a large scale. Let us separate the true from the false and set out to demonstrate the facts through all available channels.

A MODERN NUTRITION PROGRAM IN A STATE HEALTH DEPARTMENT

VLADO A. GETTING, M.D., DR. P.H.

NUTRITION in public health is neither a physical nor exclusively a medical science. A complete knowledge of the nutritional needs of the human body would not enable us to insure a fair distribution of these dietary requirements to all people. Nutrition is a medical and social science wherein we must consider not only the necessary dietary requirements of the human body but the ability of the people to purchase these foods and to prepare and cook them properly. A public health nutrition program, therefore, is concerned with a two-fold objective: first, to disseminate information relative to dietary requirements, facilities for obtaining food, and manner of preparation; second, to stimulate people to use this information personally (not just store it away) and to guide them in putting it into practice.

Public health in itself is an even broader field of social science. In its complete galaxy there are many areas of special fields. The engineer, the nutritionist, the dentist, the nurse, the educator, the political scientist, the personnel manager, the doctor, and many others make their contribution toward the administration of an effective public health program. It would be foolhardy to contend that public health nutrition is the exclusive field of the nutritionist. The engineer has an important role in nutrition, for a potable water supply, free of disease-producing organisms, is essential to good nutrition. The epidemiologist and the sanitarian play a vital part in the program by making possible the elimination of disease-producing organisms intrinsically present in some foods, such as trichina, and by minimizing the contamination of food by gastro-intestinal organisms, or enterotoxin of staphylococcus.

Food must not only be nutritious but safe. It must not only have preserved in it the various minerals and vitamins and be selective as to proper content of carbohydrates, fats and

proteins, but it must also be free from bacterial and other disease-producing organisms.

A further need must be met if the food, which is safe and nutritious, is to be of benefit to the individual who consumes it. Sometimes people who are fed apparently adequate meals consisting of food which is free of disease-producing organisms are malnourished. Even when meals complete in all the dietary essentials and prepared so as to preserve the nutritional elements are made available, there is no guarantee that the person who eats the meals will be able to assimilate the food and thereby sustain his existence. If the individual is to benefit from his food, he must be able to assimilate it. Proper digestion and absorption are prerequisites to good nutrition. Good physical health alone is not enough for we know that mental aberrations and even temporary anger and anxiety may adversely affect a person's ability to eat and severely upset his gastro-intestinal tract so as to interfere with proper digestion. Therefore, maintenance of the body at optimal mental health is also important if the nutrition program is to be of value to the individual.

In our complex civilization we sometimes overlook the fact that the distribution of food is dependent upon the sound economy which results from peace among nations. International, national, and local health workers as well must recognize the many factors which are controlled by governmental authorities and those which are determined by political or economic strife. An adequate distribution of food must be made to all—not the people of one nation alone—but to those of the whole world. All of us know that people die from pestilence, starvation, or lack of shelter. Sometimes these are isolated deaths, but frequently thousands of people are involved. Food, shelter, and protection from the elements are essential to good health. Without them the work of the health department and the nutrition workers may not only be hindered but in some instances may be completely abrogated. Therefore nutrition may be described as a social science in which the provision of an adequate diet, the maintenance of optimal physical and mental health,

and the availability of food, shelter, and protection from the elements are essential features.

Nearly one hundred years ago Lemuel Shattuck, teacher and book seller of Concord, made his classic sanitary survey of health conditions in Massachusetts. He was amazed to find that an incomprehensibly large number of people died at an extremely early age. These young people, dying in the prime of life, represented an irrevocable loss to the community. Mr. Shattuck and his committee made many constructive suggestions as to ways in which living conditions throughout the Commonwealth might be so improved that all its residents could survive long past their "thirties" and mature into independent citizens each capable of earning his own living. One of the early results of this survey was the establishment in Massachusetts, in 1869, of the first State Board of Health in the United States.

The first nutritionist, as such, was not employed in Massachusetts until 1917. She was called a Health Instructor in Foods. She distributed information pertaining to nutrition by various educational media; she gave talks, developed very interesting pamphlets, worked with various committees, and made herself available for consultation service. The rural school lunch program received its first impetus at this time. In 1922, a second nutritionist was added to our staff and she gave courses to teachers, nurses, and other professional personnel. Gradually, over the years, the nutrition program in Massachusetts has expanded until at the present time we employ twelve nutritionists in our State Department of Public Health. In addition, thirty-five more are employed by various local community agencies. Thus, our Commonwealth has forty-seven nutritionists or slightly more than 10 per cent of all the nutritionists employed in the United States.

The modern nutrition program in a community must encompass all of the elements which we have already outlined. The State nutritionists in Massachusetts work in eight geographic areas described as districts. In each of these districts there is a

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staff of professional personnel, all of whom are interested in the field of nutrition and all of whom may disseminate nutrition information to the many contacts which they make each day. This corps of workers meets at regular intervals in staff conferences, and opportunity is provided for the exchange of information and the planning of programs. The nutritionist can, therefore, imbue her fellow associates not only with a desire to preach the gospel of nutrition but also can offer them effectual information on nutrition, and hints for effective use of such information. She can take this occasion to report on the newer developments in the field of administrative nutrition as well as in the basic science dealing with nutritional requirements. The program is certainly not limited to the activities of the nutritionist.

The work of the District Nutritionist is directed administratively by the District Health Officer, who is in effect a deputy of the Commissioner for the region which he serves. For her technical guidance, she turns to the Chief Supervisor of the Bureau of Nutrition at the State House. Here, with the assistance of Advisory Committees composed of experts on nutrition and allied fields, plans are formulated for specific administrative nutritional programs. These plans are then jointly approved by the Chief of the Nutrition Bureau and the Director of the Division of Local Health Administration. Since it is important that a program of this kind be coordinated with all the other programs of the Department, the plan is then discussed by the Division Directors of the Department. Next the plan must be approved by the District Health Officer and then the new nutrition program is introduced into the district. In this way it is possible not only to coordinate programs but also to insure more complete coverage of all fields of public health activities in all geographic areas and to avoid undue emphasis or undue pressure on any one program or any one geographic area.

Not all the local or community nutritionists are employed by official health departments nor are all of them full-time per-

sonnel. The nutritional service available to the citizens on a per capita basis varies a great deal in different communities throughout the State. In addition to services rendered by local nutritionists, State nutritionists advise, consult, and guide the local programs. In areas where nutrition programs are not locally available, the Department provides some of the direct services on a demonstration basis.

Our nutrition program is often further advanced by other professional personnel of the Department. For example, restaurant sanitation is an important aspect of our program on both district and local levels. From time to time we make surveys of all food-handling establishments in various communities. Such surveys are carried out jointly by State and local health department personnel. In these surveys we endeavor to inform such establishments not only of the proper methods of handling food and food utensils, but also of the manner in which food may be prepared and served attractively and still retain the nutrients.

School lunch and industrial cafeteria programs are another important part of our program. The teaching of proper dietary requirements and habits to children is perhaps the most effective facet of any nutritional program since we are working with a group of the population which is most susceptible to education and which can carry information into the home. A health education program, no matter how well planned and executed, is of no value unless the information which it endeavors to distribute is utilized in the home. Women's clubs, parent-teacher associations, and even men's service clubs are areas of activity in which information on nutrition is disseminated, not only by our nutritionists but also by our district health officers and other Department personnel.

The preparation of pamphlets, exhibits, newspaper releases, talks, and other educational material is a joint effort in our Department. The idea usually originates with the professional person who is to present the material. In the field of nutrition studies, it is usually the nutritionist. But if the talk or article

also covers various aspects of Departmental activities, the first draft of the material is prepared by the physician and reviewed by the professional persons in the nutrition field. Next, the material is reviewed and revised by experts in public health education and public relations in the Bureau of Health Information. By these means we endeavor to serve the dish of nutrition in an attractive and acceptable manner so that it will be assimilated by individuals who will best benefit by the actual utilization of this information.

Dentists and dental hygienists in our Department realize the importance of nutrition in the formation of proper teeth. Doctors and nurses in well-child conferences and in their daily contacts with the public constantly participate in the furthering of our nutrition program.

The Division of Food and Drug Control, in addition to carrying on its duties of establishing standards of quality and quantity of food, is in a position to promote the sale of food and drugs which are prepared in accordance with accepted methods and delivered to the public in proper condition. From the analysis of vitamin preparations for content to the analysis of hamburger for rancidity, putrefication or the addition of cereal or preservatives, or other adulterants, the Division of Food and Drugs is constantly on guard to insure safe and nutritious foods for the public. An excellent example of such work is the constant battle which we are now waging against the use of mineral oils in salad dressings.

Food is and always will be one of the basic needs of life. Health departments, however, in working out their programs of nutrition must not over-zealously assume that they are the only authorities capable of furthering the science of nutrition. Many other agencies in the community can be of great value to the health department in its program and every effort should be made through health councils both on the state and local level to coordinate the work of all agencies in the health field. Special subcommittees of such health councils may well devote their attention to the field of nutrition so as to provide ade-

quate programs and insure complete coverage of the field of nutrition thereby meeting the needs of the community. Only by coordinated planning on a community, a state, or the national level, and by the best use of the facilities of the voluntary health agencies, the industries and commercial establishments, can we beneficially carry on a good program. Constant evaluation of procedure and willingness to accept changes and improvements are essential if any public health program is to help us to attain our fundamental objectives, which are the prevention of disease, the prolongation of life, and the attainment of optimal health.

SUGGESTIONS ON THE ORGANIZATION AND FUNCTIONS OF STATE HEALTH DEPARTMENT NUTRITION PROGRAMS FOR WORKERS

ROBERT S. GOODHART, M.D.

KNOWLEDGE of the factors generally responsible for malnutrition, of their relative importance and of their amenability to corrective procedures is a requisite for the conduct of effective nutrition programs. The most important causes of malnutrition in the United States are poverty, ignorance, poor food habits, and the inability to obtain the proper foods or nutrients because of inadequate production, shipping, storage, and preparation of foods, or inadequate food service facilities and, especially in the case of industrial workers, insufficient time to eat properly. In addition, factors such as physical stress, exposure to toxic substances, and disease may increase requirements or interfere with the absorption or utilization of certain nutrients and thus be responsible for the development of nutritional deficiency states.

Not all of these causes are of the same order of importance in all parts of the country, in all sections of any one state, or in all industries. The states vary in the extents to which their populations have been educated; as do urban and rural areas. Certain industries demand and obtain workers relatively well educated. The mass of workers in some other industries can barely read and write. Workers in some industries and occupations are well paid, others very poorly. Some states average much higher per worker incomes than others. Some occupations are seasonal with long periods of unemployment. Among some sections of the industrial population and in some parts of the country, traditional food patterns are more rigidly observed than in others. Much industrial work is light or only moderately heavy, but some is quite strenuous. Some workers are subject to exposure to toxic substances and others work long hours under unfavorable environmental conditions. Transportation and food production, processing and storage

facilities and practices vary from excellent to the near primitive.

It would seem, then, that the first step to be taken by a state health department, in developing a nutrition program for industrial workers, should be the definition of the problem, in terms of the prevalence and severity of malnutrition in the various sections of the working population within the state and in terms of the factors responsible for the malnutrition observed. It is presumed that the health department has defined the term "worker" sufficiently well for this purpose. For an effective program it should include not only those employed at present but also their families and those unemployed who constitute the reservoir from which additional help is drawn as needed.

The next step should be an evaluation of the more important causes of malnutrition in terms of those most vulnerable to attack and in terms of the types of remedial measures most likely to be effective and which are within the province and potentialities of the health department. It is essential to plan for both short and long-term results. Any one who has engaged at all extensively in public health work knows how very difficult it is to maintain public interest and cooperation in long-term projects that are devoid of immediate, discernible benefits. Furthermore, the immediate present is almost, if not quite, as important as the future.

It has been my experience that state health departments are prone to be conservative and are more likely to underestimate their potential effectiveness in public health projects similar to the one under discussion than to overestimate it. I have in mind the fact that a universal cause of malnutrition is poverty, one that might seem at first glance to be beyond the power of a state health department to affect. Yet there is much that can be done, within the legitimate province of the health department, to ameliorate the effects of inadequate incomes. The active promotion and continued guidance of infant feeding programs, with the opportunity they provide workers to obtain adequate meals at relatively low cost, is

such a measure. Others include education of workers and their families about low-cost adequate diets; help with budget planning (it must be borne in mind that food constitutes only a fraction of total living cost); education of the state's industry and the general public on minimum living costs and the importance of adequate diets for workers; cooperation with the state education and the state and Federal Agricultural Departments in the distribution of surplus agricultural commodities; the active support of food enrichment and fortification programs approved by such authoritative bodies as the Food and Nutrition Board of The National Research Council and the Council on Foods and Nutrition of the American Medical Association, and the intelligent advocacy of the use of nutritional supplements where indicated.

Regarding the minimum organization and staff needed by a state health department for the conduct of effective nutrition work, Dr. Harold Sandstead, Chief of the Nutrition Section of the United States Public Health Service, has written me that this staff should be headed by a medical nutritionist, who should have under his administrative control a number of nutritionists, a chemist, a laboratory technician and, depending upon circumstances, a number of nurses. According to Dr. Sandstead, the nutrition division should conduct spot surveys; furnish consultants to other departments within and without the health department; engage in nutrition teaching at universities and hospitals; operate clinics which would serve as training centers; assist in the improvement of diet practices in state institutions; act on a consultant basis to the industrial hygiene division of the health or labor department on meal planning and preparation and on the nutritional requirements of workers, and conduct general nutrition education programs. Dr. Sandstead believes the first task of the health department to be that of training physicians.

The staff just described would be concerned with the health of other sections of the population as well as that of the industrial worker, but the worker is an integral part of the whole

population of the state and his nutritional welfare cannot be solely the concern and responsibility of the industrial hygiene division and others engaged primarily in the practice of industrial medicine and hygiene. However, the state industrial hygiene division does have a special interest that should be recognized by the nutrition division of the health department. Definite responsibility for the industrial nutrition work should be assigned to a section within the nutrition division and the work should be carried on in close liaison with the industrial hygiene division. The solution of many problems arising in industrial nutrition demands special knowledge and skills not possessed by the majority of nutritionists and not acquired through sporadic visits to industrial plants. Many of the nutritionists employed by state health departments for work in industrial nutrition must acquire a large part of the needed experience while on the job. This can be assured only by designating specific long-term responsibility.

The employment of a few nutritionists will not result in any great improvement in the nutritional health of workers, if the physicians and other members of the health department then proceed to wash their hands of the matter, in the belief that they have it successfully departmentalized. Nutrition is an over-all medical and public health problem and, as indicated previously, it is affected by many and diverse factors, factors falling within the provinces of the physician, the engineer, the hygienist, the social worker, and the nurse, as well as those of the nutritionist and the dietitian. Industrialization poses problems of plant design, food service facilities, sanitation, optimum hours of work, lunch periods, shopping facilities, food and other living costs, population congestion, exposure to physical stress, exposure to noxious substances, transportation and housing, educational and recreational facilities, etc. All of which cannot be dumped into the lap of the nutritionist. I agree with Dr. Sandstead that one of the most important tasks of the health department is the education of physicians and allied workers in nutrition and its relation to health.

Many states and the United States Department of Agriculture were very active during the war and are still active in promoting feeding and nutrition programs for industrial workers. Practically all of these are entirely of a service nature, involving very little research and contributing little to the fund of knowledge concerning the health and nutritional requirements of American workers and their families. However, sufficient information has been made available by other agencies to fully justify such emergency service programs and I do not wish to decry them. For example, much has been published on the prevalence of malnutrition among the various economic and ethnic groups comprising our population and upon the factors responsible for it, sufficient to justify a considerably greater expenditure of money, time, and energy upon in-plant feeding than that actually spent to date. Incidentally, data for the year 1945 indicate that 78.0 per cent of all manufacturing establishments employing five hundred or more workers in the United States have in-plant feeding facilities and that 53.5 per cent of the workers in the plants with facilities are utilizing them for at least one meal a day (United States Department of Agriculture, Production and Marketing Administration: Report on Status of Industrial Feeding, March 15, 1946). These figures represent substantial increases over 1944.

I do wish to emphasize that there is so much of a fundamental nature to be learned in the field with which we are here concerned that state programs restricted solely to service activities should be regarded as expedients to mitigate the most glaring faults and to gain public acceptance of and support for more adequate long-term programs. The state health department should consider the acquisition, appraisal, and distribution of new information on the nutritional needs of workers and on procedures to meet those needs to be a major function of its nutrition division. It should maintain the closest possible working relationships with universities and other research and teaching institutions engaged in nutrition work within the state. Regular, annual meetings of representatives from the

nutrition divisions of all of the state health departments, to discuss mutual problems and present original papers, would undoubtedly do a great deal to advance the nutrition program in each state and I recommend this for your consideration.

WARTIME SHIFTS OF THE CIVILIAN POPULATION

HENRY S. SHRYOCK, JR.¹

DURING the war, shifts of civilian population were of many types. Construction workers migrated to the sites of army camps and other military installations that were being built, and later local service industries expanded to supply the needs of the troops. Wives followed their husbands from one military post to another. Millions of workers and their dependents moved to war production centers. Much migration would have taken place even in peacetime since there has been a secular trend from farms to cities and from East to West. The depression had dammed up this flow, and it was inevitable that increasing prosperity would swell the current. Not all migration is in search of economic opportunity. Some stems from routine personal adjustments to marriage, widowhood, divorce, retirement from the labor force, or finding a better home for growing children. If the movement of war workers was a flash flood, this latter type is a persistent trickle that adds to the migratory stream, year in and year out.

This account of wartime migration will deal with shifts of civilians, omitting for the most part the 15,000,000 persons who were in the armed forces at one time or another during the period. Practically all of these military personnel became migrants by virtue of entering the service, and their forced movement involved much more than a translation in space. Many civilian migrants also found a different way of life in their new homes; but the two phenomena differ so radically in general that it is well to separate them. The moves of veterans before induction or after discharge will be included with the civilian shifts when possible.

Except when otherwise stated, a migrant is defined here as a person whose county of residence at the beginning of a period differed from his county of residence at the end of the period. Persons entering this country from abroad (either returning

¹ From the Bureau of the Census.

citizens or aliens) are not included nor are persons moving within a county.² Moves of persons born or dying during the period are omitted. Furthermore, our definition does not count the total number of intercounty moves during the period. One person may make a dozen such moves over a five-year period; and if he returns to his original county, he becomes a nonmigrant for the whole period. It is likely that if the number of migrants were determined by our definition each year for t years, the sum of the t numbers would be well in excess of the number of migrants determined by comparing an individual's county of residence at the base date and t years later. Thus, the impressively large numbers of migrants about to be cited actually are conservative.

EXTENT OF WARTIME MIGRATION

Even in terms of our simple operational definition, the number of wartime civilian migrants can be only somewhat roughly approximated from available data. A sample survey conducted by the Bureau of the Census in March, 1945, showed that 15,330,000 civilians were then living in a different county from that of their residence at the time of Pearl Harbor (December 7, 1941).³ A study of wartime migration should cover also the five months from March, 1945, to V-J Day and probably the months of defensive preparation before Pearl Harbor. This figure is therefore lower than the one we desire.

A later sample survey taken in February, 1946, compared each civilian's county of residence then with that on April 1, 1940.⁴ The base date is fairly satisfactory, but the terminal

² Among heads of households in the period from 1935 to 1940, intracounty movers were four times as numerous as intercounty migrants.

³ United States Bureau of the Census: *Population—Special Reports*, "Civilian migration in the United States: December, 1941, to March, 1945." Series P-S, No. 5, Sept. 2, 1945. This survey included an estimated 2,000,000 veterans who had been discharged by March, 1945, of whom many were in the armed forces at the time of Pearl Harbor and probably qualified as intercounty migrants; but it did not cover the 1,300,000 civilians in institutions, a large proportion of whom had not yet entered the institution at the base date.

⁴ United States Bureau of the Census: *Population—Special Reports*, "Internal migration in the United States, 1940 to 1946." Series P-S, No. 11. December 6, 1946.

date is six months after V-J Day (August 14, 1945). The number of civilians whose county of 1946 residence differed from their county of 1940 residence was 19,500,000.⁵ From cross-classifications with migration status for the period from August, 1945, to February, 1946, and with veteran status, estimates may be made of migration status for the period from April, 1940, to August, 1945. The details are too involved to present here, but according to the assumptions chosen, I have obtained a low estimate of 16,400,000 and a high estimate of 18,200,000 for all civilians. The medium estimate is 17,200,000, or 13 per cent of the 1940 population of the United States. Again, this number represents the number of persons who were living as civilians on V-J Day in a different county from that of their residence in April, 1940.

It seems to be almost impossible to extract from the wartime data the annual fluctuations in the number of migrants. We cannot tell in which war year intercounty migration reached a peak.⁶ It seems likely that migration was heavy in all years. As will be shown below, some groups tended to move later than others.

One can readily show, however, that wartime migration was heavier than migration during the quinquennium just before the war. For the period April, 1935, to April, 1940, there were about 14,000,000 intercounty migrants. My low estimate (16,400,000) for the 1940-to-1945 period—only four months longer—is appreciably greater than this; and the medium estimate is greater by 3,200,000. The difference may not represent as much stimulation of internal migration by the war as many people think occurred. It should be noted in this connection,

⁵ Although 2,210,000 of these had been in the armed forces at some time during the period, very few were in the armed forces on April 1, 1940. Thus, practically all the indicated moves were made by civilians.

⁶ WPA surveys taken in 1941 found that in-migration to forty-one of the chief defense centers was accelerating. See Myers, Howard B.: Defense Migration and Labor Supply, *Journal of the American Statistical Association*, March, 1942, xxxvii, No. 217, pp. 69-76.

According to estimates prepared by the Bureau of Agricultural Economics, the peak rate of off-farm migration was reached in 1942. See Bureau of Agricultural Economics' *Farm Population Estimates, United States and Major Geographic Divisions: 1910-1946*.

however, that about 13,000,000 persons in the most mobile ages were excluded by definition from the wartime estimate of *civilian* migrants.

Wartime shifts of the civilian population tended to represent longer moves than those in peacetime. Of the migrants for the period 1941 to 1945, 51 per cent moved from one state to another, rather than within a state. For the longer period from 1940 to 1946, the corresponding percentage was 59. By comparison, for the peacetime years from 1935 to 1940, a minority—46 per cent—of the migrants moved between states. The WPA surveys previously noted found that the average migrant to defense centers in 1940–1941 traveled only 125 miles.⁷ Migrants to California cities, however, spanned much greater distances. Those into the Los Angeles area averaged nearly 1,300 miles.

ORIGINS AND DESTINATIONS OF MIGRANTS

Regions. The record of the origins and destinations of wartime civilian migrants is rather fragmentary. We have approximate, sample data on the interregional exchanges of civilian population between December, 1941, and March, 1945. There was a total of 3,800,000 interregional migrants. The West had a net gain of 1,160,000, to which the two Northern regions and the South contributed. All three of these other regions suffered a net loss. The South had a net loss of 340,000 to the North (that is, the North Central States and the Northeastern States combined). Counter movements were relatively large so that gross interregional shifts were well above the net ones. (See Figure 1.)

Within regions, however, there was a tremendous heterogeneity among states and counties with respect to the net migration rate. Some consistent patterns, however, are discernible in the statistical tables and maps.

States. Estimates of net migration by states for the period from April, 1940, to November, 1943, have been computed by

⁷ Myers, *op. cit.*; pp. 74–75.

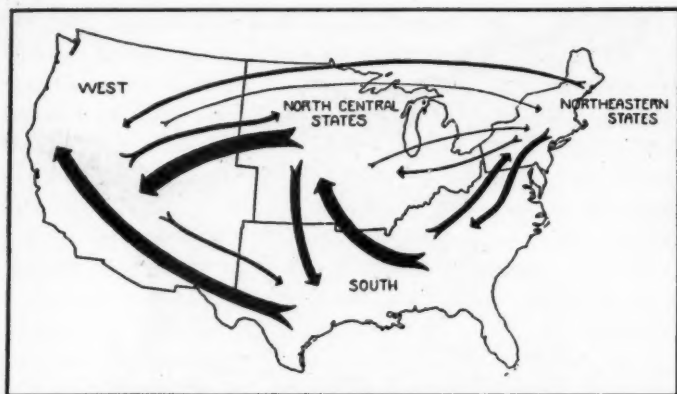


Fig. 1. Interregional migration in the United States, 1941-1945.

Hope T. Eldridge from vital statistics, statistics of inductions into the armed forces, and estimates of civilian population, which last were based mainly on ration-book registrations.⁸ The states with net in-migration were chiefly located on the East or West Coast or the Great Lakes. Along the Atlantic Coast, gains were registered from southern New England through Virginia and in Florida. These eight states and the District of Columbia gained about 1,200,000. Ohio, Indiana, Illinois, and Michigan in the East North Central States gained about 700,000; and the Pacific Coast States plus Nevada, Utah, and Arizona gained 1,900,000. California alone gained 1,400,000. The states between the Rocky Mountains and the Mississippi River together with the states south of the Ohio and Potomac Rivers (except Virginia and Florida) had a net out-migration of about 2,700,000.

Most of the "gaining" states could be characterized as industrial, whereas most of the "losing" states were primarily agricultural. Three notable exceptions were New York, Pennsylvania, and West Virginia, which had large net out-migrations.

Countries. More insight into the relationship between migra-

⁸ United States Bureau of the Census: *Population—Special Reports*, "Interstate migration and other population changes: 1940 to 1943." Series P-44, No. 17, August 28, 1944.

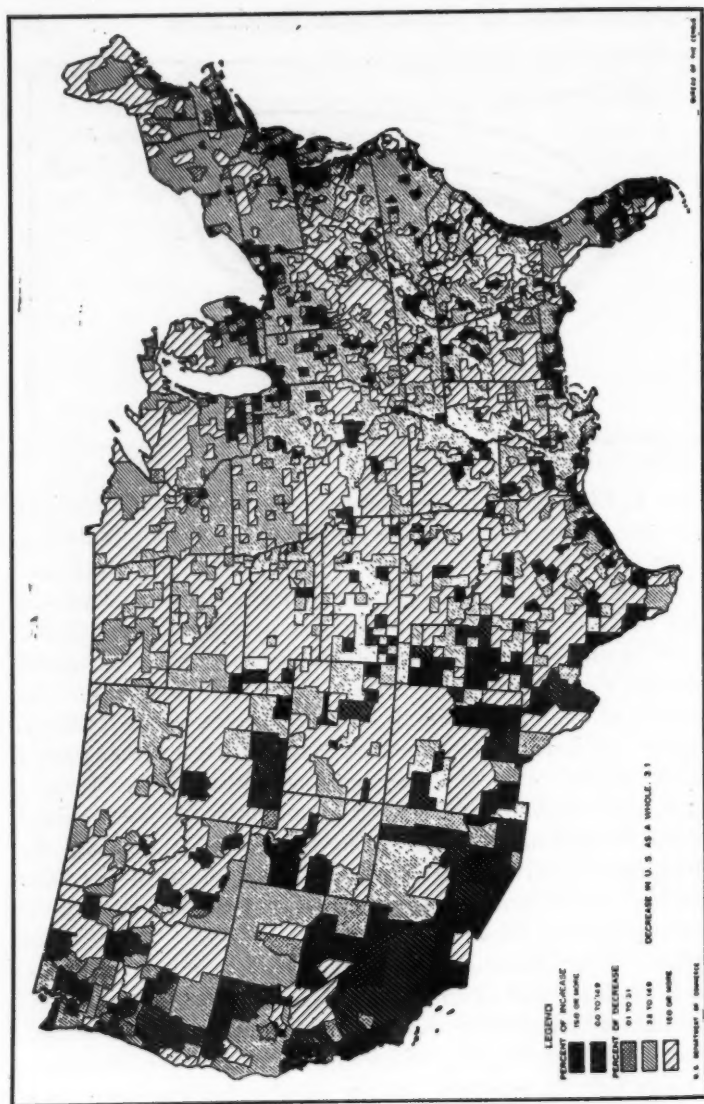


Fig. 2. Estimated per cent change in civilian population, by counties April 1, 1940 to November 1, 1943.

tion and type of area may be obtained at the county level. It was not feasible to compute net migration for each of the 3,100 counties over the period from April, 1940, to November, 1943. Instead we shall simply examine the percentage of change in the civilian population.⁹ Population change is only a rough index of net migration because of intercounty variations in rates of natural increase and in contributions to the armed forces. Nevertheless, large gains and losses must reflect net in and out-migration, respectively. (See Figure 2.)

The civilian population decreased by 3.1 per cent in the country as a whole. Only about one-seventh of the counties experienced any increase in their civilian population. Of these, 152, or about 5 per cent of all counties, increased by 15 per cent or more. These 152 were chiefly counties containing important centers of war activity; forty-three were metropolitan counties. In only six states (Arizona, California, Connecticut, Delaware, Maryland, and Rhode Island) did a majority of the counties have an increase in civilian population. Counties of apparently high in-migration were dotted along the coast line and represented ports and centers of ship-building. Another important type of area was that in which aircraft, tanks, and other military vehicles were manufactured. Munitions plants such as powder mills, and particularly the sites of atomic bomb production, tended to be located in less populous and more isolated counties. Several of such counties had meteoric spurts in civilian population growth. The last important type was the county with military installations, which for historical and strategic reasons were also well scattered about the country.

The combined metropolitan counties had an increase of 2.2 per cent in civilian population between April, 1940, and November, 1943, whereas other counties lost 8.5 per cent. Even among the 137 metropolitan areas,¹⁰ fifty-five lost civilian

⁹ United States Bureau of the Census: *Population—Special Reports*, "Estimated civilian population of the United States, by counties: November 1, 1943." Series P-44, No. 3, February 15, 1944.

¹⁰ Approximations on a county basis to a metropolitan district. A metropolitan county is one having 50 per cent or more of its 1940 population in a metropolitan district. A metropolitan area comprises one or more metropolitan counties.

population. Those that increased because of in-migration were chiefly in the South and West. Some large and old industrial areas like New York, Boston, and Pittsburgh did not have net in-migration during the war.

Residence Area. Preliminary sample data on the urban or rural residence of the civilian noninstitutional population in July, 1945, are compared with figures for the census date in the following table:

Civilian Noninstitutional Population

<i>Residence Area</i>	<i>1945</i>	<i>1940</i>	<i>Per Cent Change</i>
Total	125,880,000	130,323,000	- 3.4
Urban	74,040,000	73,830,000	+ 0.3
Rural-Nonfarm	25,750,000	26,428,000	- 2.6
Rural-Farm	26,090,000	30,065,000	- 13.2

Since inductions into the armed forces exceeded natural increase, the static size of the urban civilian population indicates net in-migration. Thus the evidence for counties and urban and rural areas shows that, on the whole, wartime internal migration served to concentrate our population even further. War contracts tended to go to the local areas that were already most developed industrially.

The nationwide sample survey of migration for the period December, 1941, to March, 1945, also dealt with shifts in residence from farm to nonfarm and vice versa. An estimated 5,400,000 civilians moved from farms to cities and other non-farm areas.¹¹ In the other direction, there was a shift of 2,500,000 civilians from nonfarm areas to farms. Thus, in the exchange, the farm population had a net loss of approximately 2,900,000.

These movements include intracounty as well as intercounty changes of residence. The type of move was tabulated in cross-classification with shift in farm or nonfarm residence for civil-

¹¹ United States Bureau of the Census: *Population—Special Reports*, "Shifts in farm population: December, 1941, to March, 1945." Series P-S, No. 6. October 29, 1945.

ians 14 years old and over only. In this age group, only 40 per cent of those moving from farms to nonfarm areas were inter-county migrants. Furthermore, a minority of such migrants crossed state lines. Distances spanned by youths and adults moving to farms were similar to these. Thus, shifts between farms and nonfarm areas tended to represent movement over rather short distances. Conversely, the highest proportion of migrants and the highest proportion of interstate migrants were found among persons who lived in nonfarm areas at both dates.

Congested Production Areas. From special sample censuses conducted in ten of the more important Congested Production Areas, in 1944, we have information concerning the origins of their in-migrants.¹² These areas were defined in terms of counties approximating metropolitan districts and comprised the Puget Sound, Portland-Vancouver, San Francisco Bay, Los Angeles, and San Diego areas on the West Coast; the Detroit-Willow Run and Muskegon areas near the Great Lakes; and the Hampton Roads, Charleston, South Carolina, and Mobile areas in the South.

There were 2,500,000 civilians living in these areas in 1944 who had moved in since 1940. They constituted 27 per cent of the combined 1940 populations. There was a tendency for a larger proportion of in-migrants to the western areas to come from outside the state, outside the geographic division, and outside the region. Cases here are few and the measure of distance spanned is a rough one; but the more numerous studies made by WPA, in which distances were given as average mileages, lead to the same general conclusion. Long-distance migration was from east to west. This situation is partly explained by the paucity of intervening opportunities for migrants to the West Coast. Moreover, this area in addition to its economic attractions and its climate, has a glamorous appeal to people in the rest of the country.

The in-migrants to the five Congested Production Areas on

¹² United States Bureau of the Census: *Population*, "Characteristics of the Population, Labor Force, Families, and Housing.—Congested Production Area: March to June, 1944." Series CA-3, Nos. 1 to 11.

the West Coast included 20 per cent from the West North Central Division and 16 per cent from the West South Central Division. The Dust Bowl in these same areas had contributed hundreds of thousands of distress migrants during the 'thirties. The "push" factor of drought abated considerably, but mechanization of agriculture and high human fertility continued to create a potential surplus of people. Booming shipbuilding and aircraft construction on the Pacific Coast were great additions to the previous "pull" factors. A similar process took place between the Detroit-Willow Run area and the East South Central Division. The latter has long been a labor reservoir for the former's automobile industry, and between 1940 and 1944 contributed 23 per cent of its in-migrants.

Only 15 per cent of all the in-migrants to the ten Congested Production Areas came from farms. In the West, former farm residents constituted only from 7 to 18 per cent of all in-migrants from elsewhere in the state, but they constituted from 13 to 19 per cent of in-migrants from outside the state. These interstate migrants from farms were characteristically from the Great Plains. In the Charleston and Mobile areas, on the other hand, a larger proportion of intrastate than of interstate migrants came from farms. These areas had a relatively larger disadvantaged farm population in their own hinterland to draw upon.

Succession Migration. To quote Myers again: "In most defense centers, however, fewer than 10 per cent of the migrants are farm workers. Even in the South, the proportion is seldom as high as 15 per cent.

"Defense centers thus far have secured their workers primarily from urban areas. Most of the rural migrants have come from villages; the proportion from the open country is very small."¹³

Yet during the war, the volume of migration from farms to nonfarm areas was the largest in American history. These persons moving away from farms went a relatively short dis-

¹³ Myers, *op. cit.*: p. 74.

tance, but we do not have an adequate summary of their destinations. The available evidence suggests, however, that most of the movers away from farms went to villages and the less active urban centers to fill the vacuum left by the departure of migrants from these areas to metropolises and the more active urban centers and by the induction of workers into the armed forces.

Of the 6,480,000 employed workers in March, 1945, who had migrated since the Japanese attack on Pearl Harbor, 1,530,000 were found in the munitions industries and 550,000 were employees of Federal, state, or local governments, where the demand for labor was most critical. The remainder may represent largely the "replacement" type of migrants who moved later to fill vacuums left in industries of intermediate activity. It seems likely, therefore, that wartime shifts in the civilian population were in accord with the well-known "law" of Ravenstein.

It has already been stated that the war accelerated internal migration in the United States. On the whole, however, wartime migration flowed through the same major channels as had been used in the previous twenty years. In an article by Eldridge and the writer,¹⁴ it is shown that the pattern of net gains and losses by states during the war had high positive correlations with the patterns in earlier periods. There were notable exceptions, of course, but the relative size of the net in or out-migration tended to persist from one period to another.

CHARACTERISTICS OF WARTIME CIVILIAN MIGRANTS

During the early period of defensive preparation, the WPA surveys found that, among workers migrating to defense centers, white males were overrepresented on the basis of their proportion in the labor force. Migrants were young and tended to be either single men or married men who had left their families behind. As the war progressed, however, the situation changed in some particulars.

¹⁴ Shryock, Henry S., Jr. and Eldridge, Hope Tisdale: Internal Migration in War and Peace. *American Sociological Review*, February, 1947, xii, No. 1, pp. 29-37.

During the period from Pearl Harbor to March, 1945, inter-county migration was predominantly female. The proportion of women even among migrant workers was slightly more than among all workers. Female migrants had become proportionately more numerous as the war went on for two reasons: (1) Millions of young men were taken from the civilian labor force into the armed forces and women workers were needed in the resulting tight labor market; (2) despite the housing shortage in war production centers, wives managed to rejoin their migrant husbands or to move with them.

Of the 2,000,000 migrants 15 years old and over into the ten Congested Production Areas between 1940 and 1944, 1,300,000, or 65 per cent, were married with "spouse present." Seventeen per cent of the migrants were under 15 years of age. These facts point to a large amount of family migration. (We cannot tell from our data how often the whole family moved together and how often the head moved first.) Although there was this large volume of family migration, the fact remains that the *proportion* of migrants was highest among unattached persons. Among lodgers in private households and persons in hotels, dormitories, and institutions, most of whom were not living with relatives, 44 per cent were migrants.

Reference has already been made to the relative youth of migrants. For the period from 1940 to 1946, the median age of migrants was 31 years, as compared with 36 years for nonmigrants who were born before the beginning of the period. The rate of migration was highest for persons 20 to 24 years old, 24 per cent of whom were migrants. The rate was lowest for elderly persons.

In the prewar quinquennium, the percentage of migrants in the nonwhite population was 8.5 as compared with 12.3 per cent in the white population. As long as jobs were scarce, prospects in new places remained relatively unattractive to members of the nonwhite races. It was certainly not a coincidence that in 1941 Negroes were underrepresented among migrants to defense production centers but were overrepresented among

the unemployed migrants there. The tightening manpower situation stimulated the migration of nonwhites. For the period 1941 to 1945, the percentages of migrants in the white and nonwhite populations 14 years old and over were about the same.

In the Northern and Western Congested Production Areas, the rate of growth of the Negro civilian population from 1940 to 1944 far exceeded that of the white. (In most of these areas, it is true, there were relatively very few Negroes in 1940.) In the three Southern areas, on the other hand, the rate of growth of the Negro population was less than that of the white. These differences in rates of population growth arose largely from differences in in-migration rates.

Almost one-third of the Negro in-migrants into the Detroit-Willow Run area came from the East South Central States, about one-quarter came from the South Atlantic States. Negroes coming into the Southern Congested Areas moved rather short distances, on the average. Almost all came from the South, and from 80 to 90 per cent came from the geographic division in which the area was located. In the Hampton Roads area, however, a larger proportion of Negroes than of whites came from outside the State. North Carolina was presumably a heavy contributor. Likewise the special census of Wilmington, North Carolina, found that between 1940 and 1946, Negroes more often than whites came from outside the State. South Carolina contributed almost half of the Negro in-migrants. There were probably many such movements of Negroes northward along the Atlantic Coast to the nearest industrial area. From 30 to 40 per cent of Negro in-migrants into these southern industrial areas were on farms in 1940—larger percentages than among the white in-migrants.

Even as early as 1941, it was found that the average migrant was bettering his economic position. Despite the unguided nature of these early movements, there was little unemployment among migrant workers in defense centers. Many new workers were lured into the labor force and found jobs, and

occupational upgrading of experienced workers was frequent. We can be sure that incomes were increased too. Later in the war period, unemployment had ceased to be an important problem for any group of workers, migrant or nonmigrant.

Despite these economic gains, the lot of the migrant was often a hard one. The hearings before the Tolan Committee and the journalistic exposés of Agnes Meyer, for instance, depict the crowded, substandard housing; the lack of sanitary facilities; the inadequate schools and play-space for children; and the strained transit systems in the boom towns. Migration itself was an arduous process because of our overburdened railroads, bus lines, and transfer companies. Finally, the temporary separation of families created difficulties and unhappiness.

PERMANENCE OF WARTIME MIGRATION

Of the estimated 17,000,000 civilian migrants between April, 1940, and V-J Day, only 1,200,000 had returned to their county of 1940 residence at the end of the first six months of peace. Gallup polls and other surveys have shown that most wartime migrants to selected centers of war production want to stay on in their new homes and are sinking social and economic roots there. From a few specialized areas like Richmond, California, and Wilmington, North Carolina, where shipyards have closed, many migrants have already departed.¹⁵ Most of the war production centers, however, need a large labor force to produce the capital and consumer goods that are now in such great demand. These areas offer higher levels of living than do the ones from which most migrants came. They are, by and large, the areas that attracted migrants during the 'twenties and 'thirties. It should be emphasized again that part of the wartime migration represented the release of a flow that was dammed up by

¹⁵ In April, 1946, a special census was taken in Wilmington, N. C. During the war a large shipyard was built in this City, from which 243 hulls were launched. The yard had already laid off most of the workers and was preparing to close, but nevertheless 28 per cent of the City's population were found to be in-migrants since April, 1940. The percentage at the peak of activity must have been considerably higher.

the depression. It would probably take another severe depression to send a large number of the wartime migrants back whence they came. Meanwhile, new and progressive migration has taken place at a high rate during the reconversion period. Between V-J Day and February, 1946, there were 3,900,000 intercounty migrants who either had not moved between 1940 and V-J Day or moved in both periods but had not returned to their 1940 county of residence. It is a good bet that many of them have gone to the young metropolitan areas of the West and South.

SPECIAL PROBLEMS OF NEGRO MIGRATION DURING THE WAR

IRA DE. A. REID¹

AMONG the more important internal migratory currents of the United States, past and present, are (1) the flight of the Negro from the land; (2) the flood-tide of population movement from South to North; and (3) the annual movement of hundreds of thousands of rural Negroes from one farm or plantation to another. The importance of these residential shifts may be indicated by the fact that in 1940 nearly one-half (48.7 per cent) of the Negroes in the United States were urban residents. In 1910 only one in every four Negroes was living in an urban center (27.3 per cent).

Even more significant than the above facts, perhaps, is the trend indicated in the decline in the number of counties where Negroes constituted 50 per cent or more of the total population. In 1900 there were 286 counties in the states of Alabama, Arkansas, Florida, Georgia, Louisiana, Maryland, Mississippi, North Carolina, South Carolina, Tennessee, Texas, and Virginia in which Negroes outnumbered whites. These counties contained 45.9 per cent of all the Negroes in the United States. By 1910 these Negro majority counties had declined to 264, with 40 per cent of the nation's Negro total; by 1920 to 221 counties, with 31.1 per cent; by 1930 to 191 counties, with 23 per cent of the total Negro population. By 1940 the number of majority counties had declined from 286 to 180, the number of Negroes affected from 4,057,619 to 2,642,808, and the percentage of the total Negro population from 45.9 to 20.5. The states named above, with the exception of Arkansas, Maryland, Tennessee, and including Oklahoma, are the areas of the most extensive Negro out-migration, the only states where the proportion of native Negroes residing in the state of their birth was lower than the percentage for native whites.²

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² United States Bureau of the Census: *Census of Population: 1940*. Series P-10, No. 35.

Yet another aspect of Negro migration that may be regarded as normal is the spatial and social mobility of farm families. A very large share of this Negro movement is the aimless and socially and economically pernicious milling around of the farm family. Though associated in the popular mind with Negro migration and supported by a stereotype that the Negro is endowed with some sort of "migratory instinct," the pattern was definitely related to the system of sharecropping. The data analyzed by T. Lynn Smith³ indicated that in the entire South 62 per cent of the whites and 49 per cent of the Negro tenants had been on the farms they were occupying in 1940 for less than five years. However, 64 per cent of the Negro sharecroppers and 72 per cent of the white ones in 1940 had been on the places they were occupying less than five years. This reservoir of agricultural labor provides the real body of South-North migration, the overflow from that reservoir yields hundreds of thousands of urban and industrial workers to other regions, but the movement of the Negro workers, who are more visible physically and socially, is the one that is regarded with alarm—perhaps not without cause. This is the background for consideration of the migration of Negro peoples within the United States between 1940 and 1945.

The recent war, like World War I, has permanently in-

Table 1. Regional distribution and increase of the Negro population: 1930 and 1940.¹

AREA	NUMBER		PER CENT OF ALL NEGROES LIVING IN AREA		PER CENT INCREASE
	1940	1930	1940	1930	1930-1940
United States	12,865,518	11,891,143	100.0	100.0	8.2
The North	2,790,193	2,409,219	21.7	20.3	15.8
The South	9,904,619	9,361,577	77.0	78.7	5.8
The West	170,706	120,347	1.3	1.0	41.8

¹ Adapted from United States Bureau of the Census: *Population-Special Reports*, Series P-10, No. 20, November 14, 1942, p. 2.

³ Smith, T. Lynn: A Demographic Study of the American Negro. *Social Forces*, March, 1945, xxiii, No. 3, pp. 379-387.

fluenced the distribution of the Negro population. After thirty years of intensive northward and cityward migration, the regional distribution of nearly 13,000,000 Negroes in the continental United States in 1940 was that indicated in Table 1.

The southern Negro population is largely a rural one (63.5 per cent) while the Negro populations of the West and North are predominantly urban—89.4 per cent in the North and 83.1 per cent in the West.

Changes in the structure and location of economic activities during the period of defense and war mobilization brought about an extensive redistribution of the nation's population. Negroes participated with other groups in that migration, but with some striking differences:

- ✓ 1. The beginning and the peak of large-scale Negro migration lagged behind similar phases in the general population shift.
2. Once the Negro migration got under way, the number involved was disproportionately large and the rate of migration more intense.
3. The proportion of Negroes remaining in the centers of immigration appeared to be significantly higher than the average for all in-migrants.

As Taeuber has indicated,⁴ "Little information is available on the migration of Negroes during the War. Indications are that some areas of the South lost large numbers of the Negro population. However, for the nation as a whole, the percentage of migrants in the 1945 civilian population was about 12 per cent for both the white and the nonwhite populations. This figure in itself indicates an increase in Negro migration as compared to the prewar period, for in 1940 the proportion of migrants among whites was almost half again as great as that among nonwhites. The 1944 Censuses of Congested Production Areas revealed that the nonwhite population increased more rapidly than the white population in the western and northern cities, where the numbers were small, and increased less rapidly

⁴ Taeuber, Conrad: *Wartime Population Changes in the United States*. The Milbank Memorial Fund *Quarterly*, July, 1946, xxiv, No. 3, pp. 238-239.

in the southern cities of Charleston, Hampton Roads, and Mobile, where the numbers were large."

In a later analysis the Bureau of the Census pointed out that the major Negro migration since the beginning of World War II started in the South and terminated in war-boom cities, regardless of location. The peculiar aspect of wartime migration was that between 1940 and 1944 Negro population movements usually started in the South and ended at such industrial points as Detroit, Norfolk, San Francisco, and Los Angeles, where Negroes could find employment in war activities. In ten Congested Production Areas the increase in Negro population from 1940 to 1944 of 49 per cent was substantially above the 19 per cent rise in the total population.⁵

In the five Congested Production Areas of the West, Los Angeles, Portland-Vancouver, Puget Sound, San Diego, and San Francisco Bay, the total Negro population grew from 107,000 in 1940 to approximately 230,000 in 1944, an increase of more than 113 per cent. In the Portland-Vancouver area the Negro population increased 437 per cent; in the San Francisco area 227 per cent. The largest absolute increase (59,000) occurred in the Los Angeles area, where the Negro population grew from 75,000 in 1940 to 134,000 in 1944. Unofficial estimates for 1945 gave Los Angeles a Negro population of 160,000. As an over-all figure it is estimated that between 1941 and 1945 more than 700,000 Negro civilians moved North or West from the South. New York estimated an increment of 25,000; Chicago has had an influx of 50,000 from Mississippi, Georgia, Alabama, and Tennessee. Cleveland now estimates its Negro population at 102,000 though it was only 85,000 in 1940. Detroit, according to the Mayor's Committee on Race Relations, has received 65,000 Negro migrants since 1940, 70 per cent of whom have come from the South. On the West Coast, San Francisco with 4,000 Negroes in 1940, reported 23,000 in 1945; Portland with 1,300 in 1940 reported 15,000 in 1945; Seattle with 3,365 in 1940 reported 16,000 Negroes in 1945. And

⁵ United States Bureau of the Census: Release, March 4, 1945.

scattered polls indicate that more than half of the people plan to remain in these centers.⁶

The Negro migration also differed from the general movement in the timing of its various phases. Whereas the peak of total migration was reached in late 1943, it was not until early 1945 that the corresponding phase of the population shift among Negroes was reached. The main stream of Negro migration did not start moving until after mid-1942, the geographical patterns corresponding to the areas of most stringent manpower requirements in 1943-1945. Large numbers of Negroes moved from farm areas in the South to southern industrial centers; from the South to the North; from the South, mid-West, and East to the Pacific Coast. It is estimated that more than 100,000 Negroes moved to southern industrial centers from other urban communities in the South; that approximately 300,000 southern Negro workers moved to the border states and northern industrial communities. The West Coast gained over 250,000 Negroes from the rural and urban South, mid-West and East, 200,000 of whom are supposed to have come from the South. Ten per cent of the migrants into California, Oregon, Washington, and Arizona were Negroes. In 1940 they formed only 1.5 per cent of those states' populations.⁷

The most important factor to influence the proportionately high Negro interstate and inter-regional migration was the racial patterning of defense training and war employment. Before its liquidation the National Youth Administration was the major source, and in many communities the only source, furnishing the facilities for skilled war-production training for Negroes. Restrictions on their employment after they had been trained forced many Negroes to leave their communities in the South in order to get the jobs for which they were qualified. This fact was amply illustrated during the early months of the war emergency and as late as January, 1943, when white labor was imported for employment in many areas where thousands

⁶ Barnett, Claude A.: The Postwar Outlook for the Southern Rural Negro. *The Journal of Negro Education*, Fall, 1945, xiv, No. 4, pp. 566-575.

⁷ United States Bureau of the Census: Release, March 4, 1945.

of local Negro job seekers with essential skills were still unemployed.

Discriminatory administration by state and local education officials of training programs financed from Federal funds, seriously handicapped Negro workers. In the states of out-migration where three-fourths of the Negro labor was to be found, training facilities were either inadequate or nonexistent. In January, 1942, Negroes constituted only 4 per cent of the total trainees for war industries in the eighteen southern and border states where they constituted 22 per cent of the total population. The only permissive outlets for full training were in the large cities of the East and mid-West; the only permissive outlets for war employment were on the Pacific Coast. The Federal government acting under its creed of training and employment "without regard as to race, creed, or color" frequently sent workers from Georgia and Alabama to Kansas, Missouri, California, and Washington when the demands were at their peaks.

Now that the war is done, there is every indication that most of the Negro in-migrants will remain in or near these congested centers and that much of the interstate migration from the South will not be reversed. Military surveys revealed that a disproportionately large ratio of Negro veterans, 75 per cent of whom were from the South, did not desire to return to their places of former residence. The war intensified the dispersion as well as the will-to-move of the Negro peoples.

It seems reasonable to anticipate a postwar migration of Negroes similar to that which followed World War I. This movement may be expected to extend more to the West than formerly while also following the traditional migration channels from South to East and North.

As a result of this wartime migration, the development of social machinery wherewith to effect democratic adjustments in human relations has become a critical problem. The movements of populations have nationalized the problems of minorities and have promoted newer types of race attitudes and

feelings. The racial tensions that accompany postwar or post-migration adjustments have begun to be felt keenly in centers that appear ill-equipped to absorb large permanent populations. The problems of health, housing, education, employment are not eliminated by this movement; they are merely scattered and the need for action remains.

However, some special aspects of this Negro migration should be kept in mind as significant for any program of adjustment:

✓ 1. The spatial mobility of Negro populations, especially from South to North, may be regarded as a permanent characteristic of this population element for some time.

2. The migration of this war period was a maturer movement than were the earlier ones. The element of settlement is present; women frequently preceded men into the new areas and provided the basic security of residence for their men in the armed services.

3. There is a new line of movement involving agricultural workers who are remaining in agriculture. There is a movement of Negro workers across the expanding cotton belt of the South, following cotton from Georgia, Alabama, and the Delta into Texas, Arizona, and New Mexico, and continuing into California with the truck gardening.

4. The racial character of seasonal agricultural migration, the acceleration of Negro workers on the East coast, and their use in the sugar, corn, and wheat belts, is a new migration incentive.

5. The problems of intra-minority movements also stand out. For the first time Negroes, Japanese-Americans, and Orientals are meeting at migration cross-roads and becoming potential victims of further economic exploitation and maladjustment. The displacement of Japanese-Americans and Orientals by Negroes in the residential areas of the Pacific Coast is a case in point.

6. The spread of "southern" race attitudes and practices by the migrating southern white population has to some extent been responsible for the growth of such subversive organizations as the KKK on the Pacific Coast.

7. On the other hand, the spread of Negro labor to the Pacific

Coast gave that area the opportunity to break down such racial limitations in employment as were practiced by the International Brotherhood of Boilermakers, Iron Shipbuilders, and Helpers of America which for more than 50 years had given Negroes only auxiliary membership in that organization.

8. The stream of migration may continue from the South into the areas of freer living. The present *push* of Negro talent out of the South by southern states which do not provide full facilities for the higher education of Negroes, but do give them scholarship aid for training in an institution of their choice in other states is certain to affect the social composition of the South's Negro population and to provide increasingly capable and experienced social and political leadership in the areas of in-migration.

9. If present indications are ominous, travel facilities for Negroes in the South are going to be altered as the states seek to offset the nondiscrimination rulings of the Supreme Court. Evidences of this fact are noted in South Carolina, Georgia, and Alabama.

10. Furthermore, and finally, any further abridgment of political rights for Negroes in southern states, as is threatened in Alabama and Georgia, and as has already taken place in Arkansas and South Carolina, will assure a steady stream of settlers in urban areas of the North and West where the racial accommodation pattern is less partial and more easily manipulated.

Thus, and though the estimates of the volume of this migration lack the validity of verification, it may be reasonably concluded that the migration of the American Negro during World War II represented a movement both spatial and social, with greater dispersion in both fields than had been previously experienced. This mobility in time and space, and the social circulation it permitted, indicated that Negro migration continues to be the free movement of individuals and families in response to economic opportunities. The Negro migrant continues to be normally a proletarian industrial or agricultural worker who from necessity has to seek his fortune among socio-cultural strangers. And in back of his decision to move may be

found the usual motivations of general cultural, economic, political, and social conditions in the areas of out-migration, as well as the personal desires for the economic and social gain, racial escape, and social adventure allegedly present in the areas of in-migration.

This migration, though basically a search for economic rewards, continues to carry power and prestige for the racial universe. The northward and westward movements have served as safety-valves for the steaming engines of social discontent in southern cities. They have provided outlets for the socially discontented in southern rural areas, where it has not gone unrecognized that the greatest economic, political, and social rewards seldom go to farmers. Well might we pose the premise that this unplanned movement of Negroes in response to economic opportunities promotes sound social redistribution, and that the areas of greatest and most stable opportunity for them are frequently those that superficially and temporarily appear to be the most undesirable as places of in-migration for other peoples. This thesis has great implications for the adjustment of racial and ethnic groups in the United States. Its tenableness can at least be viewed with equanimity, if not with positive proof.

PROJECTION OF URBAN GROWTH AND MIGRATION TO CITIES IN THE UNITED STATES

PHILIP M. HAUSER AND HOPE T. ELDRIDGE¹

THE volume and direction of internal migration and the growth of cities are a function of a number of variables none of which is subject to rigorous control. They are determined by such factors as long-time trends in our economy and in economic opportunity; fluctuations of the business cycle; changes in political and social organization; changing mores, folkways and attitudes; regional and urban-rural differentials in fertility and mortality; immigration; and, of course, trends in total population growth.

As is usually the case in the realm of human affairs, the safest and frequently the only way of foreseeing the future lies in an analysis of the past. The combined influence of the factors enumerated above and many other variables is reflected in the actual trends in urban growth, and in the observed patterns of internal migration.

The historical patterns of urban growth and internal population movement in the United States are fairly well known. From analysis of these trends it is possible, on the assumption that no radically new economic and social elements will enter the picture, to make certain broad qualitative predictions with reasonable safety. For example, on the basis of this assumption it may be predicted with some confidence that the rate of urban growth will be dampened by the decline in the growth of the total population of the Nation; that regional differentials in urban growth will continue for some time, with more rapid development in the South and West than in the North; that cities in the North will reach points of stability or even population decline in advance of cities in the South and West; that rural-farm population will continue its net movement to urban places. On the basis of observed trends, it is possible even to make reasonably reliable short-run predictions of the prospects

¹ From the Bureau of the Census.

for population growth of individual urban areas as one of the writers has attempted.²

It is another matter, however, to attempt quantitative predictions of the volume and direction of internal migration or of urban growth. Even if all the variables that have stimulated or inhibited urban growth in the past could be isolated, measured, and predicted, it still would not be a simple matter quantitatively to predict urbanization in the United States and to quantify the volume of future migratory flow to and from our cities. Nevertheless, it is important to know, or at least to have some quantitative feel of, what the future holds in store on the growth of cities and on urban internal migration. A preliminary attempt is therefore made in the materials which follow to get at some approximation of the outlook—to set up some ranges within which the course of events may fall.

It is to be emphasized that the quantifications of future urban growth and migration to cities presented in this paper are not intended as predictions of the future. The estimates presented are projections, not predictions. That is, they indicate what would happen under the explicitly stated assumptions. The estimates are, in fact, presented as ranges in accordance with varying assumptions. The one thing that we can be certain about is that the assumptions will not hold.³

The historical pattern of urban growth is tied to irregular social and economic changes. The course of urbanization in the United States has been somewhat uneven and erratic—precipitate in one period, quiescent in another. There has been some correspondence between rates of population growth and rates of urban growth and some correspondence between economic prosperity and urban expansion. Despite discernible

² Hauser, Philip M.: Wartime Population Changes and Postwar Prospects, *Journal of Marketing*, January, 1944.

³ The Thompson and Whelpton estimates of future urban population, prepared in 1934, indicated a high and low that bracketed the actual count in 1940, but their high estimate for 1950 is lower than a recently prepared estimate for 1946 based on the results of a sample survey. See Warren S. Thompson and P. K. Whelpton, "Estimates of Future Population by States" published by the National Resources Board, December, 1934.

associations of this type, it is quite possible that the very factors that have drawn people into cities in the past may in the future disperse them. Technological advance, which stimulated industrial concentration, may in another phase decentralize the economic operations of our society. Such a development could make it possible for the population to eat its cake and have it too, in the sense of living more spaciouly while losing none of the advantages of urbanization. On the dark side, there is even now, in the atomic bomb, a technological threat to concentrated living, a threat which may scatter the population hastily and without the satisfactions of urban "culture."

These are the types of considerations that make it impossible to predict the future of urban growth, and force us rather to an analysis of the past as a basis for the preparation of projections, though even the projection of historical trends is not without its difficulties.

Two central tasks are here attempted: First, to project to the year 2000 the urban population of the Nation and the future population of places having 100,000 inhabitants or more; second, to project to the same period the volume of net migration to cities.

Assumptions. The general assumption that underlies these projections, is that no sudden or drastic changes will occur in our economic development, or in our social and political organization. That is, it is assumed that the combination of forces which have determined urban growth in the past will continue to operate in much the same way in the future.

In spite of the short-run fluctuations in urban growth in the United States, fairly definite overall trends are discernible. The proportion of the population living in urban places has increased during every decade since 1790, except the decade 1810 to 1820 (probably the aftermath of the war of 1812). The percentage increase in urban population has been greater than the percentage increase in total population during every decade except 1810 to 1820. The increase in the percentage urban has varied from a high of 6.9 percentage points, 1880 to 1890, to

a low of 0.3 percentage points, 1930 to 1940; (there was a loss of 0.1 percentage points from 1810 to 1820) with no apparent pattern beyond the fluctuations coinciding with troughs and peaks of economic activity. The percentage increase in the proportion urban has shown some tendency to decline slightly since the turn of the century, but because the last few decades have been characterized by economic extremes (from prosperity in the 'twenties, to extreme depression in the 'thirties, and back to prosperity in the 'forties) it is difficult to guess to what extent urban growth rates are representing aberrations and to

Table 1. Growth of the urban population of the United States, 1790 to 1946.

YEAR	TOTAL POPULATION	URBAN POPULATION		INCREASE IN PER CENT URBAN DURING PRECEDING PERIOD	
		Number	Per Cent of Total	Absolute Increase	Percentage Increase
1790	3,929,214	201,655	5.1	—	—
1800	5,308,483	322,371	6.1	1.0	19.6
1810	7,239,881	525,459	7.3	1.2	19.7
1820	9,638,453	693,255	7.2	-0.1	-1.4
1830	12,866,020	1,127,247	8.8	1.6	22.2
1840	17,069,453	1,845,055	10.8	2.0	22.7
1850	23,191,876	3,543,716	15.3	4.5	41.7
1860	31,443,321	6,216,518	19.8	4.5	29.4
1870	38,558,371	9,902,361	25.7	5.9	29.8
1880	50,155,783	14,129,735	28.2	2.5	9.7
1890	62,947,714	22,106,265	35.1	6.9	24.5
1900	75,994,575	30,159,921	39.7	4.6	13.1
1910	91,972,266	41,998,932	45.7	6.0	15.1
1920	105,710,620	54,157,973	51.2	5.5	12.0
1930	122,775,046	68,954,823	56.2	5.0	9.8
1940	131,669,275	74,423,702	56.5	0.3	0.5
1946					
(Estimate)	141,229,000	84,753,000 ¹	60.0	3.5 ²	6.2 ²

¹ This estimate contains no allowance for increase through reclassification. An allowance of 500,000 would give an estimate of 85,253,000, or 60.4 per cent of the total population.

² The equivalent decennial increase in the percentage urban is 5.6 percentage points (9.9 per cent of the 1940 proportion) with no allowance for increase through reclassification. An allowance of 500,000 would give an equivalent decennial increase over 1940 of 10.4 per cent in the proportion urban.

what extent they are reflecting an alleged secular trend (see Table 1 and Figure 1).

Of all the factors which have had a significant effect historically on the rate of urban growth in the short run, the swings of the business cycle seem to be among the most important. These fluctuations in urban growth in response to the rise and fall of the economic barometer are likely to occur in the future as they have in the past. A projection of the short-run rate of growth that accompanied each extreme of the business cycle within recent decades can therefore be made with some assurance that the most creditable prospect lies somewhere between the two.

Thus, within the framework of a relatively stable economic, social, and political climate, allowance is made in our projections for differing rates of urban growth under differing conditions of economic weather. These are: (1) Conditions of full production and full employment, (2) conditions of medium production and medium employment, and (3) conditions of low production and low employment. For purposes of the projections, the first is assumed to be represented by urban growth between 1920 and 1930, a period of boom prosperity; the last by growth between 1930 and 1940, a period of deep depression. The second or medium condition of production and employment is assumed to be that of the whole twenty-year period, 1920 to 1940, or an "average" of the first and third.⁴

Methods and Procedures. The estimates of urban population in the United States for 1946, as shown by the results of a sample survey conducted by the Bureau of the Census in July 1, 1946,⁵ were used as a base population for the projections.

Urban population growth in the United States is a function

⁴ Urban growth between 1940 and 1946 was similar to growth during the 1920's, at least so far as changes in the proportion urban are concerned. (See Table 1.)

⁵ United States Bureau of the Census: *Population*, Series P-S, No. 19, "Urban and Rural Population of the United States, by Age and Sex: 1946, 1945, and 1940." The data in this release refer to the civilian noninstitutional population. For the estimate presented in our Table 1, adjustments have been made to include members of the armed forces and persons in institutions.

of total population growth. Since projections of total population growth are available and since it is known that the rate of population growth is declining and approaching a point of stability, it is clear that the size of the total population sets a limit on urban growth. The characteristic that was projected, therefore, is the percentage urban of the total population. The projected proportions were applied to revised estimates of the future population of the United States recently prepared by the Bureau of the Census in cooperation with P. K. Whelpton of the Scripps Foundation for Research in Population Problems.⁶ These revised projections are the "medium" set, that is, estimates of the future population based on assumptions of medium fertility, medium mortality, and no immigration after July, 1945. The projected proportions can, of course, be applied to other population projections to obtain estimates of the urban population under different assumptions of overall population growth.

In terms of actual computation, the following procedures were observed. The geometric annual average percentage increase in the proportion urban was computed for the decades 1920 to 1930, and 1930 to 1940, for the high and low urban projections. A similar average for the whole period 1920 to 1940 was computed for the medium projections. Because of the lack of distinct historical trends in the rate of change in the percentage urban of the total population, the rates of change for the various levels of future urban growth were held constant in the projections. The annual rates of increase were applied to the percentage urban in 1946 and resulting proportions were computed for decennial intervals, 1950 to 2000. The proportions were then applied to the projected population totals to obtain the urban population for each date. The results are presented in Table 2 and Figure 1.

⁶ A preliminary release presenting medium estimates, 1945 to 2000, was recently published by the United States Bureau of the Census in *Population, Special Reports*, Series P-46, No. 7. The full report containing forecasts based on various assumptions with respect to the future courses of fertility, mortality, and immigration will be published later in 1947.

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YEAR	TOTAL POPULA- TION	URBAN POPULATION					
		Low		Medium		High	
		Number	Per Cent of Total	Number	Per Cent of Total	Number	Per Cent of Total
1950	145,460,000	87,421,000	60.1	89,022,000	61.2	90,476,000	62.2
1960	153,375,000	92,792,000	60.5	98,620,000	64.3	104,448,000	68.1
1970	159,847,000	97,187,000	60.8	107,897,000	67.5	119,246,000	74.6
1980	163,877,000	100,129,000	61.1	116,189,000	70.9	133,724,000	81.6
1990	164,585,000	101,055,000	61.4	122,616,000	74.5	147,139,000	89.4
2000	163,312,000	100,764,000	61.7	127,710,000	78.2	159,719,000	97.8

Table 2. Projected urban population of the United States, 1950 to 2000.

Estimates of Urban Population. On this basis, the urban population of the United States under sustained conditions of high production and employment will be 104,000,000, or 68 per cent of the total population in 1960. Under conditions of low production and employment, the 1960 urban population is estimated at 93,000,000, or slightly more than 60 per cent of the total; and under conditions of medium production and employment at about 99,000,000, or 64 per cent of the total.

The figures for the year 2000 are merely a demonstration of what would happen if the assumed rates of change in the urban proportion should remain constant until the end of the century. Thus, in the high projections, about 98 per cent of the population is shown to be urban in the year 2000.

As the situation is today with respect to agricultural productivity, habits of living, suburban trends, industrial labor force potentialities, and related matters, this "high" estimate does not seem a very likely eventuality. On the other hand, by the year 2000 our patterns of living may have changed so radically that the present meaning of the term "urban" may have vanished and the universe of discourse we now employ in this connection may find no comparable application. With respect to the high projections, it should also be noted that even if the rate of increase in the percentage urban had been allowed

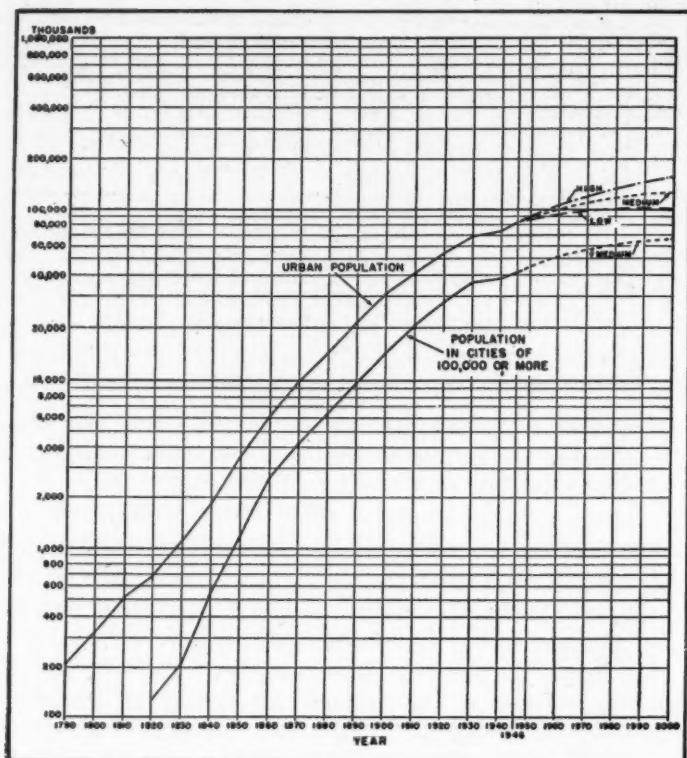


Fig. 1. Growth of urban population, 1790 to 1946, and projection, 1946 to 2000.

to diminish gradually as is suggested by the data for the period since 1850, the percentage urban obtained for the year 2000 would still be extremely high. An allowance for a decrease in the amount of increase in the proportion urban of 0.1 percentage point per decade (beginning with an increase of 5.7 percentage points in the decade 1940 to 1950) would yield an urban proportion of about 90 per cent in 2000.

The low series shows that, at the "depression" rate of increase in the proportion urban, cities would begin to lose popu-

lation near the end of the century, as the total population passes its peak and begins a gradual decrease.

The medium series, being a composite of the high and low projections, implies fluctuations between these extremes. It is shown as a smooth trend simply because it is not possible to predict the timing and severity of future fluctuations. This series indicates for the year 2000 an urban population of some 128,000,000, or 78 per cent of the total, as compared with the present 85,000,000 or so, roughly 60 per cent of the total. The decennial detail for the various projections is shown in Table 2 and in the chart.

Estimates of Migration to Cities. The problem of estimating the change through migration to and from urban areas that is implicit in these projections is more difficult. Because of the mobility of the population, a true estimate of natural increase in urban population cannot easily be made for past periods, let alone for the future. Much of the natural increase that occurs in urban areas results from the fertility of in-migrants to urban areas. It is possible, theoretically, to obtain an estimate of the urban population that would be expected at any time if no in-migration had occurred during preceding decades. It would be necessary, however, to apply age-specific birth and death rates to the urban population on a chosen base date and to prepare two sets of population estimates similar to the forecasts prepared for the United States, one allowing for in-migration and one not. In this way the cumulative effect of migration upon urban growth could be measured. Data for this kind of calculation are not readily available, although reasonable estimates could perhaps be made with sufficient time and facilities.

One fact is ascertainable in this connection, however. During the modern era, urban birth rates have been such that without in-migration to urban areas American cities would eventually experience natural decrease rather than natural increase. The intrinsic rate of natural increase of the urban population was - 11.4 per thousand during the period 1935 to

PERIOD	INCREASE IN URBAN POPULA- TION	NATURAL INCREASE		INCREASE DUE TO RECLAS- SIFICA- TION	INCREASE THROUGH MIGRATION	
		Number	Annual Rate per 1,000 Persons		Number	Annual Rate per 1,000 Persons
<i>Low Urban Projections (with low natural increase)</i>						
1950-1960	5,371	2,711	3.0	1,000	1,660	1.8
1960-1970	4,395	2,185	2.3	1,000	1,210	1.3
1970-1980	2,942	1,381	1.4	1,000	561	0.6
1980-1990	926	201	0.2	1,000	-275	-0.3
1990-2000	-291	-1,110	-1.1	1,000	-181	-0.2
<i>Medium Urban Projections (with medium natural increase)</i>						
1950-1960	9,598	3,664	3.9	1,250	4,684	5.0
1960-1970	9,277	3,098	3.0	1,250	4,929	4.8
1970-1980	8,292	2,022	1.8	1,250	5,020	4.5
1980-1990	6,427	359	0.3	1,250	4,818	4.0
1990-2000	5,094	-1,253	-1.0	1,250	5,097	4.1
<i>High Urban Projections (with high natural increase)</i>						
1950-1960	13,972	4,487	4.6	1,500	7,985	8.2
1960-1970	14,798	3,915	3.5	1,500	9,383	8.4
1970-1980	14,478	2,783	2.2	1,500	10,195	8.1
1980-1990	13,415	421	0.3	1,500	11,494	8.2
1990-2000	12,580	-1,381	-0.9	1,500	12,461	8.1

Table 3. Projected net migration and natural increase in the urban population of the United States, 1950 to 2000. (All figures, except rates, in thousands.)

1940.⁷ The depressed conditions of the 1930's may be accountable in large part for this high inherent rate of natural decrease, but the intrinsic rate of natural increase for the period 1905 to 1910 was -2.3 per thousand, showing that the fertility of cities has been potentially below replacement levels at least since the early part of the present century. Urban net reproduction rates were 726 per thousand for the period 1935 to 1940 and 937 per thousand for the period 1905 to 1910.⁸

⁷ United States Bureau of the Census: SIXTEENTH CENSUS OF THE UNITED STATES, 1940, POPULATION, DIFFERENTIAL FERTILITY, 1940 AND 1910, "Standardized Fertility Rates and Reproduction Rates," Table 9.

⁸ *Op. cit.*, Table 7.

A rough indication of the decennial contribution of migration to future urban growth can be obtained by assuming that urban crude rates of natural increase will maintain a constant ratio to national rates of natural increase and by comparing the expected urban increase under this assumption with the various projected estimates of urban increase. For this purpose, ratios of urban to national rates were computed for the same three periods as those used for the population projections: 1920 to 1930 (high ratios of urban to national rates of natural increase, therefore high urban natural increase), 1930 to 1940 (low ratios of urban to national rates, therefore low urban natural increase), and 1920 to 1940 (intermediate ratios, therefore medium urban natural increase). These ratios were adjusted for the trend from 1920-1930 to 1940-1944 and applied to the future national rates of natural increase derived from the population projections for the United States. Three sets of future urban rates of natural increase were obtained (*see* Table 3).

One further adjustment was needed to allow for changes in urban classification. Urban areas are redefined in each census as additional places become eligible for the urban classification and others lose eligibility. There is always some increase in urban population as a result of reclassification. For present purposes, a decennial allowance of 1,000,000 to 1,500,000 is made for reclassification. This allowance is based on analysis of data from earlier decades.

The remainder of the decennial urban increase, after deductions for natural increase and reclassification, is the estimate of net change through migration to and from urban areas. The estimates according to the three sets of basic assumptions are shown in the last two columns of Table 3.

The high projections indicate that increasingly larger gains through migration will be necessary, in conjunction with declining national fertility, to maintain the type of urban growth that characterized the prosperous decades of the 'twenties and 'forties. The low projections show that a depression type of

YEAR	NUMBER	PER CENT OF TOTAL	INCREASE IN PERCENTAGE DURING PRECEDING PERIOD	
			Absolute Increase	Percentage Increase
1820	123,706	1.3	—	—
1830	202,589	1.6	0.3	23.1
1840	517,216	3.0	1.4	87.5
1850	1,174,668	5.1	2.1	70.0
1860	2,638,781	8.4	3.3	64.7
1870	4,129,989	10.7	2.3	27.4
1880	6,210,909	12.4	1.7	15.9
1890	9,697,960	15.4	3.0	24.2
1900	14,208,347	18.7	3.3	21.4
1910	20,302,138	22.1	3.4	18.2
1920	27,429,326	25.9	3.8	17.2
1930	36,325,736	29.6	3.7	14.3
1940	37,987,989	28.9	-0.7	-2.4

Table 4. Population in cities of 100,000 or more inhabitants, 1820 to 1940.

urbanization will become de-urbanization by the year 2000, that net gains through migration will dwindle through the coming decades and will finally become a net loss during the period 1980 to 2000.

The medium projections indicate that an average decennial net gain of some 5,000,000 through migration will be required to produce moderate urban growth if the vicissitudes of the business cycle continue to frequent the American economic scene.

Cities of 100,000 or More. Urban growth within the United States, at the various levels of concentration, has been a fairly unified process. The proportion of the population living in places of 100,000 or more inhabitants has increased in much the same way as the proportion living in all urban places. In most decades, the increase in the proportion of the population in the large cities has proceeded at a more rapid rate than the proportion urban, but the overall pattern was very similar (see Table 4 and chart). The outstanding exception is the decade 1930 to 1940, when the proportion in large cities actually de-

creased, and the proportion urban increased slightly. A "medium" projection of the population in cities of 100,000 or more has been made on the same basis as that used for the urban

Table 5. Projected population in cities of 100,000 or more inhabitants, 1950 to 2000. (Medium assumption.)

Year	Number	Per Cent of Total
1950	45,674,000	31.4
1960	50,920,000	33.2
1970	55,946,000	35.0
1980	60,634,000	37.0
1990	64,188,000	39.0
2000	67,285,000	41.2

projections. The results of this assumption (that is, the assumption that the rate of increase in the ratio of cities of 100,000 or more to the total population which obtained for the period 1920 to 1940 will persist in the future) are

shown in Table 5. According to these data, more than 67,000,000 persons, or 41.2 per cent of the total population, will be living in cities of this size class by the year 2000, as compared with about 38,000,000, or 28.9 per cent in 1940.

Value of Projections. The estimates presented above are based on a relatively crude methodology, and the assumptions used undoubtedly represent a great oversimplification of the factors influencing urban growth and internal migration. The projection of the high rates of urban increase, for example, obviously results in a highly improbable outcome, at least under present conditions of total population growth in the United States.⁹

Moreover, the changing composition of the urban population in terms of levels of concentration and groupings by city size is perhaps of more importance than the number of persons that live in all places of 2,500 or more inhabitants combined or in the two broad size classes here presented. The Census definition of urban is arbitrary and, although convenient, does not fully embody the concept "city." In the past, the largest cities seem to have shown a somewhat greater sensitivity to the business

⁹ The projections could have been made asymptotic to the limits set by the overall population projections for the United States, but this was not considered necessary for purposes of this paper.

cycle than have the great bulk of smaller places. This is particularly noticeable in the 1930's. In addition, growth responses to economic change have varied widely on a geographic basis. An example is the contrapuntal growth of New York City and Washington, D. C. New York, the national urban center *par excellence*, has tended to grow rapidly during periods of prosperity, and slowly during periods of crisis or economic stress. Washington, on the other hand, reflecting Federal participation in the social and economic life of the Nation as it cushions the shock of adverse conditions, has grown rapidly during periods of economic stress, and slowly during periods of prosperity. Within the general trends shown in the present projections, then, there are possibilities of many varieties of city growth as relating to size, arrangement, and geographic location.

Broader interpretations of the concept "urban" and the concept "city" can perhaps be made even within the framework of the Census definition. But there are practical difficulties in the way. Cities are strictly defined and enumerated in terms of their political boundaries; and the lag between the expansion of a city as a population unit and the revision of its corporate limits,¹⁰ as well as the functional and qualitative differences that exist between one city and another, are not easy to pin down in statistical data.

The general assumption used for the present projections, namely that urban concentration will continue, is of course subject to challenge. One popular theory with respect to urbanization is that the process of dispersion has already begun. Proof is offered in comparisons of the percentage increase in the cities proper with increases in surrounding areas. The latter almost invariably show greater rates of growth. This kind of resettlement is often interpreted as the beginning of de-concentration which may eventually result in the reduction of the

¹⁰ The metropolitan district concept, already introduced into the census is an approach to measuring the "true" city, but so far only places of 50,000 or more inhabitants have been treated in this way, and very little has yet been accumulated on which to base historical comparisons.

density of cities and a more even distribution of the population over the country. This may be the correct interpretation, but from another viewpoint, "suburbanization" may be regarded, not as de-concentration, but rather as a by-product of the process of concentration whereby a city grows by accretion at the periphery, while the center, the area of business activity and large daytime population, forms a residential hollow that enlarges as business activity increases and city growth progresses.

Yet, despite the crudities of the methods used and the debatable character of the assumptions, the projections are nevertheless useful tools in indicating what would happen if past trends continued under the stated conditions. They also serve as a background for evaluating the effects of additional factors which could influence urban growth and migration to cities. For example, although it is clear that the urban population of the United States is not likely by the year 2000 to reach the level indicated in the "high" estimates, it is conceivable that the urban population could reach such a magnitude if the immigration laws were changed and additional population were recruited from abroad. Or, conversely, the "high" projection could be interpreted as indicating that the deceleration of total population growth in the United States will prevent the continuation of the same rate of urban growth in the future, even during periods of great prosperity and economic opportunity, that was achieved in the past.

Finally, the methods employed in the preparation of these projections, with such refinements as may be indicated by the specific purposes to be served, suggest a way for projecting the population of the various regions and other subdivisions of the United States. Such broad regional projections could in turn set limits of growth for subdivisions of the region, including city populations; and, perhaps, provide a sounder basis for local population projections than other methods now frequently employed.

ANNOTATIONS

HOW TO LIVE¹

THE subtitle of the book, *How to Live*, is *Rules for Healthful Living Based on Modern Science*, and aptly describes its central theme. This latest edition, the twenty-first to be published since the initial appearance of the book in 1915, has been very extensively rewritten by Irving Fisher, the original senior author, and Haven Emerson, who replaced the late E. L. Fisk, as junior author. Several sections in the book have been written by other authorities in special fields, and many scientists in such fields as physiology, psychology, nutrition, and medicine have given advice on the present text. Thus, up-to-date, scientific data are interpreted for the layman in non-technical language and made the basis of specific instructions for attaining optimal health.

The subject matter of this book is what man should do for himself in order to realize his potentialities for a high level of health and vigor. No matter how many diseases can be cured by adequate medical care, nor how many can be prevented by control of the environment, and by immunizing procedures, "man's health and happiness will still lag far behind their possibilities unless man learns to do for himself what is good for his health, happiness, and longevity." The problems of individual hygiene are grouped under four major headings: (1) Man's contacts with the outer world, (2) food, (3) common poisons, and (4) activities. Under the first topic, the functions of the skin are described and the hygiene of clothing, housing, and bathing are discussed. The subject of food and man's nu-

¹ Fisher, Irving and Emerson, Haven: *How to Live*. New York and London, Funk and Wagnalls Company, 1946, 21st Edition, 354 pp. \$2.50.

tritional requirements is treated extensively in eight chapters and two supplementary chapters giving tables of food values and sample menus. Under the heading "Our Common Poisons," there is a discussion of the present evidence on the effects of alcohol, tobacco, coffee, tea, and chocolate and three short chapters on mouth health, defecation, and infection. The chapters on "Our Activities" give brief but comprehensive advice on many aspects of work and play, rest and sleep with attention to such problems as monotony, worry, and fatigue, and to the value of exercise, hobbies, recreation, and acquiring mental poise. On all subjects specific advice is given to guide the reader in formulating rules of hygiene best suited to his own conditions of life.

The facts presented in this book should be known by everyone. Health workers recognize today that one of our greatest public health problems is to develop the interest of individuals in practicing healthful habits in their every-day life. How to LIVE not only elaborates rules for hygienic living but also gives the bases for such rules and tells the benefits to be expected. This book can be read to personal advantage by laymen in all walks of life and is suitable for the high school ages.

It is possible to question some statements as, for example, the following: "many Americans, perhaps most, do suffer from a mild degree of anemia due to a lack of iron in the hemoglobin of their blood" (p. 83). Of more importance to the objectives of this book, *i.e.*, to persuade people to follow its rules for healthful living, is a tendency to emphasize some points that are of minor or even dubious significance. The essentials for an optimal diet are clearly described, and the attainment of such diet by most persons would be an achievement. It seems of dubious value to urge the avoidance of all refined sugar, and of salt and condiments, to the extent that these prohibitions form the basis of two of the twenty-two rules of personal hygiene. Even though caffeine is a stimulant, the moderate use of coffee or tea has not been shown to reduce the health and vigor of healthy people, and its use is recommended for some old people; therefore, it seems unfortunate to advocate complete exclusion of coffee and tea and group them along with alcohol and tobacco. Since attention to weight is recommended, one

wonders why the normal weight tables included in previous editions have been omitted.

DOROTHY G. WIEHL

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THE MONEY VALUE OF A MAN¹

SINCE 1930, when Dublin and Lotka published the first edition of *THE MONEY VALUE OF A MAN*, this book has proved its value to health administrators, as well as to other professional groups concerned with the problem of setting a value on human life and disabilities. The new and completely revised edition now available will be welcomed by former users and should gain many new users of the important data which is so ably presented.

The specific objective of the book is to furnish estimates for the *average* man of "the present value of his net future earnings, *i.e.*, of his gross future earnings less that part which is expended on himself" (p. 70). Obviously, the amount of future earnings varies according to earning capacity (wages) of the man, his present age and expectation of life. Therefore, tables are presented which give present value of gross and net future earnings for a man of each year of age from 21 to 64 years at sixteen different earning levels and at three levels of mortality, average mortality for 1939-1941, above and below average.

But estimates of the money value of the average man do not constitute the only data of interest in this book. Much basic data had to be collected for computation of the gross and net values and the authors' discussion of these data and related information furnishes a comprehensive description of a number of social and economic conditions as well as of mortality trends in the United States. For example, a chapter on *The American Family* (new to this edition) gives material on age at marriage, marriage rates, size of family, chances of widowhood, and on number of orphans; and a second new chapter on *Income in Relation to Age and Economic Status* presents data on sources of family income, on variation of annual earnings according to

¹ Dublin, Louis I. and Lotka, Alfred J.: *THE MONEY VALUE OF A MAN*. New York, The Ronald Press Company, 1946, Revised Edition, 214 pp. \$6.00.

age and on proportions employed at different ages for four occupational classes according to the 1940 Census.

The dependents of a man may be protected against the loss of his future earnings in case of death by life insurance. During his life, a wage-earner may suffer considerable wage loss for a number of reasons, especially as a result of physical impairments or handicaps which reduce earning ability and of disabling illness and accidents which result in loss of wages and often in a large expenditure for medical care. The extensive data on impairments, disabling illness, and costs of medical care collected during the past twenty years are summarized in this new edition by Dublin and Lotka. Through prevention of many diseases public health has reduced the economic loss to the family from these causes, and the economic value of public health is clearly shown. The various forms of social insurance developed to protect the wage-earner and his family are described in a chapter on Social Insurance in Relation to the Money Value of a Man.

As a source of unique data on the economic value of man's productive years of life and also of much social and health data, this book should be invaluable to professional health and social workers.

DOROTHY G. WIEHL

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HEALTH INSTRUCTION YEARBOOK¹

THE fourth edition of the HEALTH INSTRUCTION YEARBOOK contains abstracts of 384 articles appearing in scientific, statistical, medical and public health journals from July, 1945 through June, 1946. The author, Oliver E. Byrd, an Associate Professor of Hygiene at Stanford University, integrates and briefly summarizes the material included in the abstracts at the beginning of each of the twenty-one chapters. The chapter headings, including such titles as, "Health as a Social Problem," "Nutrition and Health," "Mental Health and Disease," "Infection and Immunity," "Health Services and Facilities,"

¹ Byrd, Oliver E.: HEALTH INSTRUCTION YEARBOOK, 1946. Stanford University Press, 1946, 399 pp. \$3.00.

"Trends and Possibilities," are the same as in the third edition, with one additional chapter called "International Health."

The paucity of information on health conditions in many countries throughout the period of the war makes the inclusion of the chapter on "International Health" in this edition of particular interest to the public health worker. Many of the references were obtained from the Epidemiological Information Bulletin, correspondents of the American Medical Association, and representatives of such agencies as United Nations Relief and Rehabilitation Administration, and the majority are concerned with reports on the prevalence of epidemic diseases.

The book has a complete bibliography for the abstracts included and both an author and a subject index. A more complete system of indexing subjects would be helpful for quick reference. The classification of the chapter headings is broad and there is considerable overlapping of the problems as the author recognizes when he says, "A discussion of the problems of health which have social significance is not confined to this chapter for it is apparent that in a society as closely integrated as that of the world today there can be little or no personal illness that does not influence in one manner or another the health of other individuals" (p. 19). One should be justified then in expecting the index to serve as a guide for locating a particular subject in any part of the book. But that is not always possible. For example, one of the chapter titles is "Nutrition and Health." There appears in the chapter "School Health" an abstract of a report on a nutrition survey in the Florida schools, yet the subject "Nutrition" is not listed in the index.

Despite this shortcoming which is common to many books, the HEALTH INSTRUCTION YEARBOOK will prove a timely and convenient reference book for the shelf of the health worker who desires to keep abreast of his subject when new material in the field of medicine and public health is being presented in ever increasing numbers in journals and periodicals today.

KATHARINE BERRY

